

BHL

B.M.

E.L.

27.I.

THE FRANCIS WALKER TYPES OF TRICHOPTERA
IN THE BRITISH MUSEUM





*James Tuckey,
Francis Walker.*

BRITISH MUSEUM (NATURAL HISTORY) 7.00 (25p) 1.00 (25p) 1.00 (25p)

THE
FRANCIS WALKER
TYPES OF TRICHOPTERA
IN THE BRITISH MUSEUM

RE-DESCRIBED AND FIGURED BY

CORNELIUS BETTEN, PH.D.

CORNELL UNIVERSITY, ITHACA, NEW YORK

AND

MARTIN E. MOSELY, F.R.E.S., F.Z.S.

DEPARTMENT OF ENTOMOLOGY, BRITISH MUSEUM (NATURAL HISTORY)

LONDON

PRINTED BY ORDER OF THE TRUSTEES OF THE
BRITISH MUSEUM

1940

Issued 8th June, 1940

Price Fifteen Shillings



*Made and printed in Great Britain by
Adlard & Son, Ltd.,
at their works, Bartholomew Press, Dorking.*

P m
E6.
27 I

PREFACE

It is estimated that in the sixty-eight little 12mo volumes by Francis Walker published by the British Museum between the years 1844 and 1873, some 50,000 species of insects were listed. Many of these were described as new, and all the principal Orders of insects were thus catalogued by Walker wholly or in part, except the Coleoptera. Similar catalogues by other authors were also published simultaneously. These volumes mark a period in the entomological history of the British Museum of which, however, there is little cause to be proud, yet it would be unfair to judge them by modern standards or to ignore the circumstances of their publication. Had they remained but simple stock-taking lists they would have served equally well their original purpose and avoided the just criticism of students. As it is, though their influence upon the care of the collections has undoubtedly been beneficial, the same cannot always be said of their influence on entomology; they are an example of the unwisdom of allowing the curatorial needs of Museum work to outweigh its scientific standards. Nevertheless, there is no disputing that the publication of these lists created a nucleus of described species, and a catalogue of named specimens around which many of the collections have been built. In the Trichoptera, or Caddis Flies, Francis Walker certainly laid the foundations for all subsequent work on the American species, of which, in his time, very few had been named.

It is unfortunate that in those early days, nearly one hundred years ago, neuropterists had not realized, as students of some other orders had, that colour and wing pattern unsupported by any but the grosser structural characters, were quite inadequate guides to specific recognition in the Trichoptera. As a consequence it has become increasingly difficult, with the lapse of time, to associate certainly the old, faded, and often fragmentary specimens, which are the types of Walker's descriptions, with the species now established upon morphological characters of which Walker was unaware. In consequence much confusion in nomenclature has arisen, especially among the North American species, which could only be dispelled by a critical re-examination of Walker's types, preferably by someone thoroughly acquainted with those species.

When, therefore, in 1936 Professor Cornelius Betten of Cornell University visited this country for the express purpose of examining these Walker types, the opportunity was taken of suggesting to him that he should collaborate with Mr. M. E. Mosely, who is in charge of the Trichoptera in the Museum, in the preparation of a catalogue of these specimens such as would settle satisfactorily all the thorny problems that have vexed American Trichopterists for so many years. To this he readily agreed. The joint authors have also made

use of the occasion to redescribe, besides the North American species which occupy the greater part of the volume, all the other species which Walker described of which the existing material is fit for description, so that the present work represents an almost complete catalogue of all the Caddis Flies described by Francis Walker, whose portrait appears as a frontispiece to this book.

The Trustees are indebted equally to Professor Betten and to Mr. Mosely for the labour spent on the preparation of this volume, and particularly to Professor Betten for devoting so much of his brief visit to the task. They hope that the publication of this volume will finally dispel all the obscurities that have so long surrounded this small portion of their trust.

N. D. RILEY,
Keeper of Entomology.

March 21, 1940.

INTRODUCTION

IN the classification of the Trichoptera reliance must be placed almost wholly on structural characters, inasmuch as colour, vestiture and size are so variable as to be of only minor value in this connection. As a consequence, the earlier descriptions, lacking details of structure and unaccompanied by figures, have left many of the species of this order difficult of recognition. This applies particularly to the species described by Francis Walker, the types of which are preserved in the British Museum (Natural History). These types are mainly of North American species, and since they were the first to be described from that continent they may be said to constitute the foundation of the classification of North American Trichoptera. There is therefore every reason for an attempt to make the determination of these species more easy and reliable.

Nearly all Walker's descriptions were published in 1852, in the *Catalogue of the Specimens of Neuropterous Insects in the Collection of the British Museum*; the remainder appeared in a paper entitled *Characters of Undescribed Neuroptera in the Collection of W. W. Saunders, Esq., F.R.S., etc.*, published in the *Transactions of the Entomological Society of London* in 1860. Many of the specimens described were collected considerably earlier, some of them a full century ago. As might be expected, these types are not all in good condition, and most of them did not have the wings expanded. Since repeated examination of these old and fragile specimens would inevitably result in further deterioration, it was decided to make a thorough study of them in their present state, and to preserve the structural parts of most importance in permanent fashion after they had been described and figured. In general, the genitalia, and sometimes the head and palpi have been mounted in canada balsam, and the wings, after cleaning and softening, secured and mounted between sheets of celluloid. The figures and the descriptions of the genitalia have all been made from material cleared in caustic potash before being mounted in balsam.

It is desirable to point out that we have found in many of the species an amount of variation in colour and structure between specimens collected in different parts of America so great that we have been perplexed at times as to how to treat them. We have, in general, thought it best to describe an extreme form as a distinct species, rather than, by linking it with a particular species, to give that species an immensely wide and perhaps an unnatural range. Thus, we have retained *Phryganea divulsa*, recorded from Haiti, as distinct from *P. cinerea*, with which many authors regard it as synonymous,

although the latter is recorded from as far north as the Arctic regions. So also in *Neuronina* we have differentiated species that are not unlikely to be reduced to synonymy upon further study.

We have considered it to be the prime purpose of this study to describe the Walker types as they now are; it will of course be understood that the resulting descriptions of colour and vestiture are therefore not the best that could be made for the species if fresh examples were used. Further, with questions of classification, of homology of the structures described, and of synonymy, insistent as these may be, we have not concerned ourselves more than absolutely necessary, the time available for our co-operative effort making a restriction of our objectives imperative. Thus, for example, we have used the genera *Phryganea* and *Neuronina* in the older and broader sense without entering upon the problem of the most useful subdivision of these groups.

We gratefully acknowledge the generosity of other students of the Trichoptera who have co-operated with us. Chief among these is Mr. Nathan Banks, of the Museum of Comparative Zoology, Harvard University, who has responded freely to our inquiries and has also sent us material needed for comparison. Dr. H. H. Ross, of the Illinois State Natural History Survey, has aided in a similar way, and so has Mr. Donald G. Denning, of the University of Minnesota. Dr. Georg Ulmer has kindly lent us for examination some specimens which were presented to him from the Walker series on the occasion of his study of the British Museum collection in 1907.

The drawings in this paper have been made by Mr. D. E. Kimmins, who in the process has constantly given us the benefit of his well-trained judgment, and thus contributed substantially to the reliability of our work.

Altogether, Walker, in his descriptions of new species, listed 178 specimens, and to these we may perhaps add the two specimens of *Mystacides sepulchralis* which, while not listed, carry labels in Walker's handwriting (see p. 71). There are a few other cases in which we find specimens, which were received by the Museum in collections used by Walker, slightly in excess of the number listed by him. It is of course impossible to say that these actually came under his observation, and they are therefore not included in this tabulation.

Of the 180 specimens which apparently passed through Walker's hands we find in the collection (counting also 4 of Walker specimens in Dr. Ulmer's collection) a total of 171, of which 89 or 88 are males, 79 or 80 are females, and 3 are in such condition that their sex cannot be determined; 9 specimens are missing. The uncertainty as to the precise number of males and females lies in the fact that it is impossible to say whether of three specimens of *Leptocerus submacula* in the collection the two listed by Walker are a male and a female (as is assumed in the chart, p. 183) or, quite as likely, two females.

The nine missing specimens include one of the species listed by Walker as *Hydropsyche robusta*, the single specimen listed as *Hydroptila ? parva*, the specimen listed as *Leptocerus inconspicua*, which was identified by McLachlan as a Hydropsychid, two of those listed with others as *Limnephilus designatus*, and one each of those listed as *Philopotamus distinctus*, *Neuronina fusca*, *Neuronina concatenata* and *Macronema albobirens*.

The original 180 specimens were classified by Walker in 24 genera and 101 species; in our present arrangement of the 171 specimens now remaining there are 50 genera and 101 species, counting *Allegophylax subfasciatus*, which is doubtfully determined. Of Walker's 101 specific names, 78 are retained, two have become preoccupied (see the new names *Hydropsyche walkeri*, p. 21, and *Macronema australe*, p. 193), and 21 are found to be synonyms. The 21 names which take the place of these synonyms (thus restoring the total to 101 species) apply wholly to specimens which Walker had failed to recognize as distinct from the species which he described. Fifteen of the species represented by these specimens have already been described by other authors; six are here described as new. Two new genera are also described (*Trentonius*, p. 14, and *Frenesia*, p. 165), and a new variety (*redmani*) of *Neuronia pardalis* Walker (p. 97).

As here classified and now found in the collection, 43 of the species are reported from the American continent north of the United States, counting 2 reported also from Georgia. Including the 2 just referred to, there are 20 species listed from Georgia. Besides these there are 8 species whose only designation is North America (4 doubtfully so recorded), 1 listed only as from the United States, 1 from New York State, 2 from the St. Lawrence River, 2 from the West Indies, 10 from South America, 5 from Asia, 5 from the Australian region, 3 from Africa, and 2 from Europe. One species (*Neuronia childreni*) described as new is of uncertain locality.

Of the North American material used by Walker, by far the greater part was derived from the collections of Barnston in the Hudson Bay region and of Abbot in Georgia.

An analysis of the origin and of the present generic placement of the Walker types is made in the tables presented on pp. 183 and 243.

PART I

NORTH AMERICAN SPECIES



RHYACOPHILIDAE.

Rhyacophila fuscula (Walker).

(Fig. 1.)

Phryganea fuscula Barnston MSS.

1852. *Neuronia fuscula* Walker, Cat. Neur. Brit. Mus.: 10.
 1861. *Rhyacophila fuscula* Hagen, Syn. Neur. N. Amer.: 295.
 1863. *Rhyacophila fuscula* McLachlan, Ent. Annual: 163.
 1864. *Rhyacophila fuscula* Hagen, Verh. Zool. Bot. Ges. Wien, **14**: 878.
 1873. *Rhyacophila fuscula* Hagen, Proc. Boston Soc. Nat. Hist., **15**: 385.
 1892. *Rhyacophila fuscula* Banks, Trans. Amer. Ent. Soc., **19**: 365.
 1907. *Rhyacophila fuscula* Ulmer, Genera Insect., fasc. **60a**: 210, pl. 41, fig. 4.
 1907. *Rhyacophila fuscula* Banks, Cat. Neur. Ins. U.S.: 41.
 1933. *Rhyacophila fuscula* Carpenter, Psyche, **40**: 40, fig. 5.
 1934. *Rhyacophila fuscula* Betten, N.Y. State Mus. Bull., **292**: 130, text-figs. 26a, b, pl. 6, figs. 1-5.
 1936. *Rhyacophila fuscula* Milne, St. N. Amer. Trich., **3**: 101, fig.

Walker describes the species as follows :

"*Ferruginea, nigro-hirta, subtus testacea ; thorax maculis duabus subfuscis ; tibiae anteriores apice fuscae ; alae cinereae, anticae albido irroratae.*

"Ferruginous, partly clothed with black hairs, testaceous beneath : thorax with a brownish mark on each side : legs testaceous ; anterior shanks black towards the tips : wings gray : fore-wings with whitish dots which are more numerous along the border than in the disk. Length of the body $4\frac{1}{2}$ lines ; of the wings 12 lines.

"*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

We add the following description :

Head and *thorax* dark brown, the head with pale and with black hairs ; the few remaining antennal joints are brown at the base and lighter at their distal ends, with a covering of short, pale hairs ; *legs* pale, except that the tarsi and the distal ends of the tibiae of the middle legs are distinctly darker ; the *fore wings*, lacking the bright coloured pubescence of fresh examples, light brown with white markings, many white spots along the costal margin, a conspicuous white area on the proximal half of the posterior margin, this area angled towards the middle of the wing, scattered dots also in other areas, some of them forming a small arc reaching the wing margin just beyond the tip of M_1 and again, just beyond the tip of M_3 ; *hind wings* light in colour, with a few white dots along the anterior apical margin.

Length of the fore wing, male, 13 mm.

Genitalia, male.—Apical margin of the 9th dorsal segment produced at its centre, a minute excision at the centre of the margin of the produced part ; upper penis-cover broad, apical margin deeply excised to leave two angular projections whose fringed apices may be seen beyond the margin of the 9th segment ; there are some short bristles on the under-surface towards the base and a large Y-shaped process, sloping downwards, arising from its lower surface

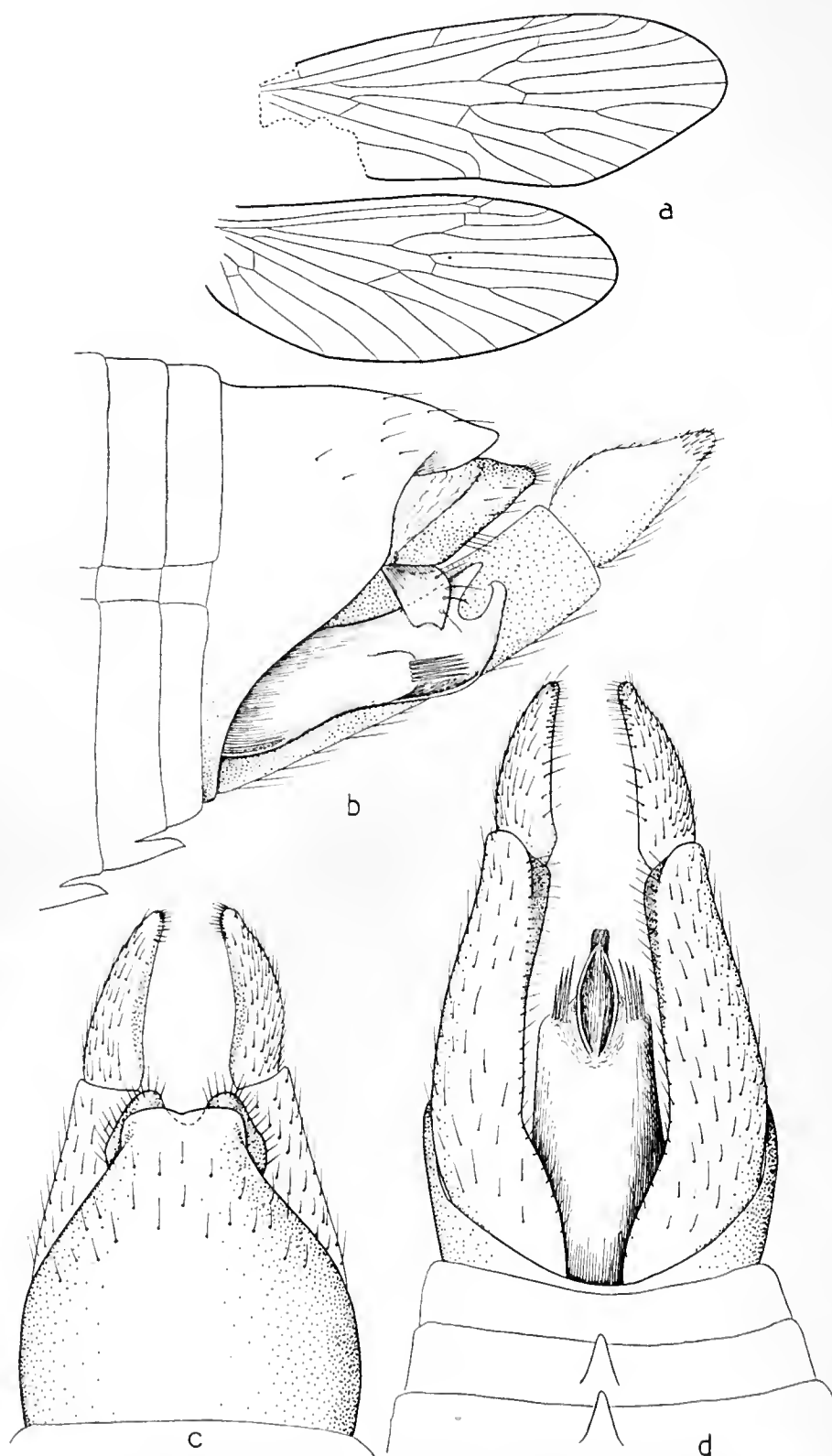


FIG. 1.—*Rhyacophila fuscule* Walk. ♂: *a*, wings; *b*, genitalia, lateral, nearer inferior appendage removed, *c*, dorsal, *d*, ventral.

at the base, the apices of the Y clavate, strongly chitinized and fringed with short bristles, lower margin excised; penis from the side, broad at the base, apex upwardly directed and bifurcate, the two forks separated by a rounded excision; a narrow, paired keel on its under-surface; on each side is a bunched group of hairs; inferior appendages with a short second joint which tapers to an acute apex, upper margin sinuous; ventral processes arising from sutures at the middle of the 6th and 7th segments.

The single type-specimen, a male, is considerably damaged, the antennae being broken off near the base, the fore legs lacking, the palpi not well shown; the wings also are not altogether complete. The most characteristic features are, however, well shown in this type and consequently there has never been any difficulty in the recognition of the species.

***Rhyacophila invaria* (Walker).**

(Fig. 2.)

- 1852. *Polycentropus invarius* Walker, Cat. Neur. Brit. Mus. : 101.
- 1861. *Polycentropus invarius* Hagen, Syn. Neur. N. Amer. : 292.
- 1863. *Polycentropus invarius* McLachlan, Ent. Ann. : 163.
- 1864. *Polycentropus invarius* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 874.
- 1892. *Polycentropus invarius* Banks, Trans. Amer. Ent. Soc., 19 : 367.
- 1907. *Polycentropus invarius* Ulmer, Genera Insect., fasc. 60a : 184.
- 1907. *Polycentropus invarius* Banks, Cat. Neur. Ins. U.S. : 48.
- 1911. *Rhyacophila luctuosa* Banks, Trans. Amer. Ent. Soc., 37, no. 4 : 351, pl. 13, fig. 24.
- 1930. *Rhyacophila invaria* Banks, Bul. Brooklyn Ent. Soc., 25 : 130 (*R. luctuosa* reduced to synonymy).
- 1934. *Rhyacophila invaria* Betten, N.Y. State Mus. Bull., 292 : 131.
- 1936. *Rhyacophila invaria* Milne, St. N. Amer. Trich., 3 : 95, 111, figs. (*R. luctuosa* listed as synonym).
- 1938. *Rhyacophila invaria* Ross, Psyche, 45 : 6, pl. 2, fig. 9 (lectotype of *luctuosa* designated).

Walker describes the species as follows :

“*Fulvus, aureo-hirtus; antennis vertice thoracisque disco nigris; pedes testacei; alae anticae subfuscae, posticae cinereae.*”

“Tawny, clothed with gilded hairs: crown of the head and disk of the thorax black: antennae black, a little longer than the body, tawny at the base: legs testaceous: fore-wings brownish; veins ferruginous: hind-wings gray. Length of the body $2\frac{1}{2}$ lines: of the wings 8 lines.

“*a. Nova Scotia. From Lieut. Redman's Collection.*”

To this we add :

Head and *thorax* black, practically nude; *legs* yellow; *fore wings* light brown, uniformly and rather thickly covered with tawny pubescence; the pterostigma is well marked in both pairs of wings.

Length of the fore wing, male, 9 mm.

Genitalia, male.—The centre of the margin of the 9th tergite is produced in a trifid plate with its margin closely beset with short teeth which extend

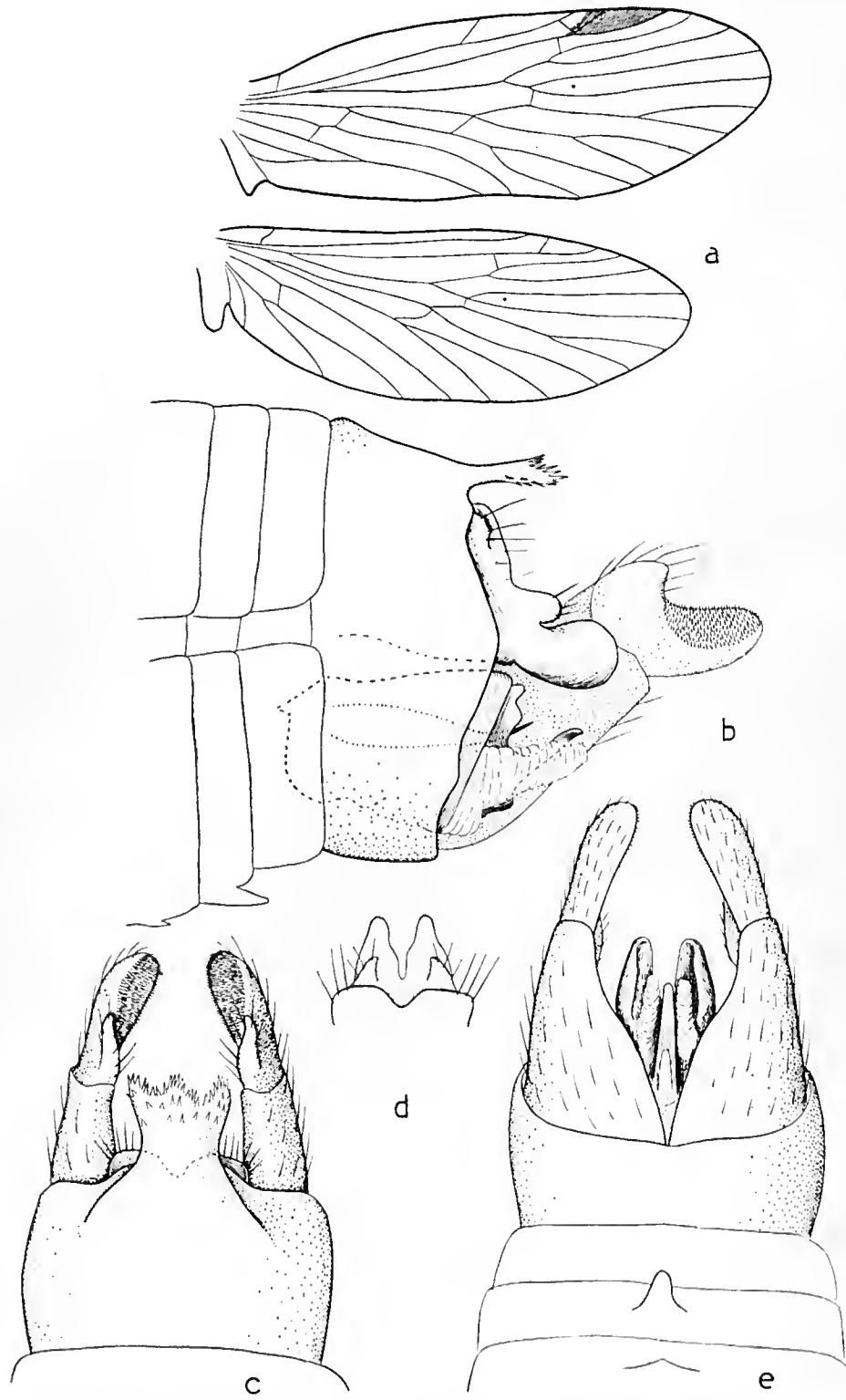


FIG. 2.—*Rhyacophila invaria* Walk. ♂: *a*, wings; *b*, genitalia, lateral, nearer inferior appendage removed, *c*, dorsal, *d*, apex of upper penis-cover, from above, *e*, genitalia, ventral.

thinly towards the base of the plate ; beneath this is an upper penis-cover consisting of three shelving parts, the second and third forming distinct paired processes ; the upper part is somewhat widely excised at the centre of its apical margin ; the middle part forms a pair of widely separated, short, triangular lobes, rounded from the side ; the lowest part extends considerably beyond the others and, from above, consists of a pair of long, triangular processes divided from each other by a deep excision with an abrupt angle at the inner margins so that the base of the excision forms a deep cleft ; from the side, the lowest part of the penis-cover is dilated to a large, rounded apex, the inner surface being covered with minute indentations which do not appear to be the sockets of denuded hairs ; penis, from the side, very stout at its base, with the lower margin produced in a straight, slightly upwardly directed process ; there is a pair of long penis-sheaths ; lower penis-cover membranous, divided at the apex to leave a pair of membranous fingers ; inferior appendages with the apical joint short ; from the side, with a right-angled excision of the upper margin leaving a broad, distally directed hook above and a projecting lower part whose inner surface is thickly set with short setae ; a strong process to the 7th, and a wide, feeble process or ridge at the centre of the 6th ventral segment.

The type is a male specimen which now lacks the antennae and the fore legs.

Synagapetus walkeri sp. n.

(Fig. 3.)

1852. *Beraea* ? *obscura* Walker, *partim*, Cat. Neur. Brit. Mus. : 121.
 1863. *Chimarra* *obscura* McLachlan, *partim*, Ent. Ann. : 160.
 1864. *Agapetus obscurus* Hagen, *partim*, Verh. Zool. Bot. Ges. Wien, **14** : 801.
 1892. *Beraea obscura* Banks, *partim*, Trans. Amer. Ent. Soc., **19** : 366.
 1907. *Agapetus* ? *obscurus* Ulmer, *partim*, Genera Insect., fasc. **60a** ; 214.
 1907. *Beraea obscura* Banks, *partim*, Cat. Neur. Ins. U.S. : 44.
 1934. *Agapetus obscurus* Betten, *partim*, N.Y. State Mus. Bull., **292** : 142.

Walker describes the species as follows :

“ *Nigricans*, *fusco-hirta* ; *pectus et abdomen ferruginea* ; *pedes testacei* ; *alae nigro-fuscae, ciliatae*.

“ Blackish, thickly clothed with brown hairs : antennae black : breast and abdomen ferruginous : legs testaceous : wings blackish brown, deeply fringed. Length of the body $1\frac{1}{2}$ lines ; of the wings 4 lines.

“ *a, b.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.”

We add :

Head reddish brown, clothed with blackish hairs ; *oculi* black ; *ocelli* whitish ; only the basal and four following joints of one antenna remaining on the type ; these joints are reddish-brown ; of the maxillary and labial palpi, only a few basal joints on one side are left ; *legs* reddish brown, one

anterior, one median (tibiae and tarsi much dilated), and a complete posterior and a portion of the other posterior leg remaining; *fore wing* pale reddish, clothed with a dense reddish pubescence, fringes long and reddish; *hind wing* pale reddish-brown with a similarly coloured fringe; *abdomen* reddish brown, paler beneath, terminating in a long, tapering ovipositor of the usual type found in the *Agapetus* group, and presenting no distinguishing characters worth illustrating.

Length of the fore wing, female, 4.5 mm.

Walker had two specimens which he described as *Beraea* ? *obscura*. We have selected the male as the type of that species and place it in the genus *Chimarrha* (p. 17). The other specimen is the female described above as the type of our *Synagapetus walkeri*.

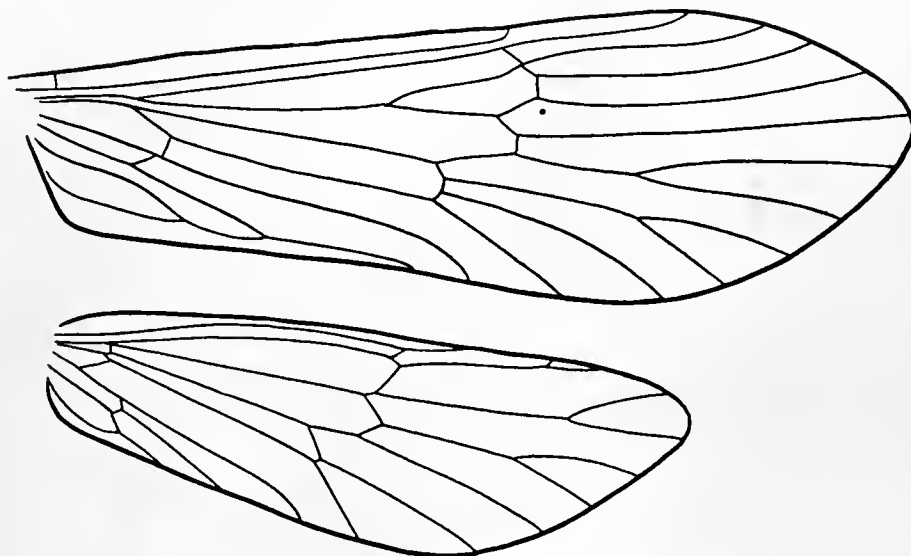


FIG. 3.—*Synagapetus walkeri* sp. n. ♀: wings.

HYDROPTILIDAE.

Protoptila tenebrosa (Walker).

(Fig. 4.)

- 1852. *Hydroptila tenebrosa* Walker, Cat. Neur. Brit. Mus. : 134.
- 1861. *Hydroptila tenebrosa* Hagen, Syn. Neur. N. Amer. : 274.
- 1863. *Agapetus tenebrosa* McLachlan, Ent. Ann. : 158, 163 (quotes Hagen's opinion that some of the types belong to *Agapetus*).
- 1864. *Agapetus tenebrosa* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 802.
- 1892. *Agapetus* ? *tenebrosus* Banks, Trans. Amer. Ent. Soc., **19** : 365.
- 1907. *Agapetus tenebrosus* Ulmer, Genera Insect., fasc. **60a** : 214.
- 1907. *Hydroptila tenebrosa* Ulmer, Genera Insect., fasc. **60a** : 223.
- 1907. *Agapetus tenebrosus* Banks, Cat. Neur. Ins. U.S. : 41.
- 1934. *Agapetus tenebrosus* Betten, N.Y. State Mus. Bull., **292** : 142.
- 1934. *Protoptila tenebrosa* Mosely, Trans. R. Ent. Soc. Lond., **82** : 149-151, figs. 30-35.
- 1936. *Protoptila tenebrosa* Milne, St. N. Amer. Trich., **3** : 74.

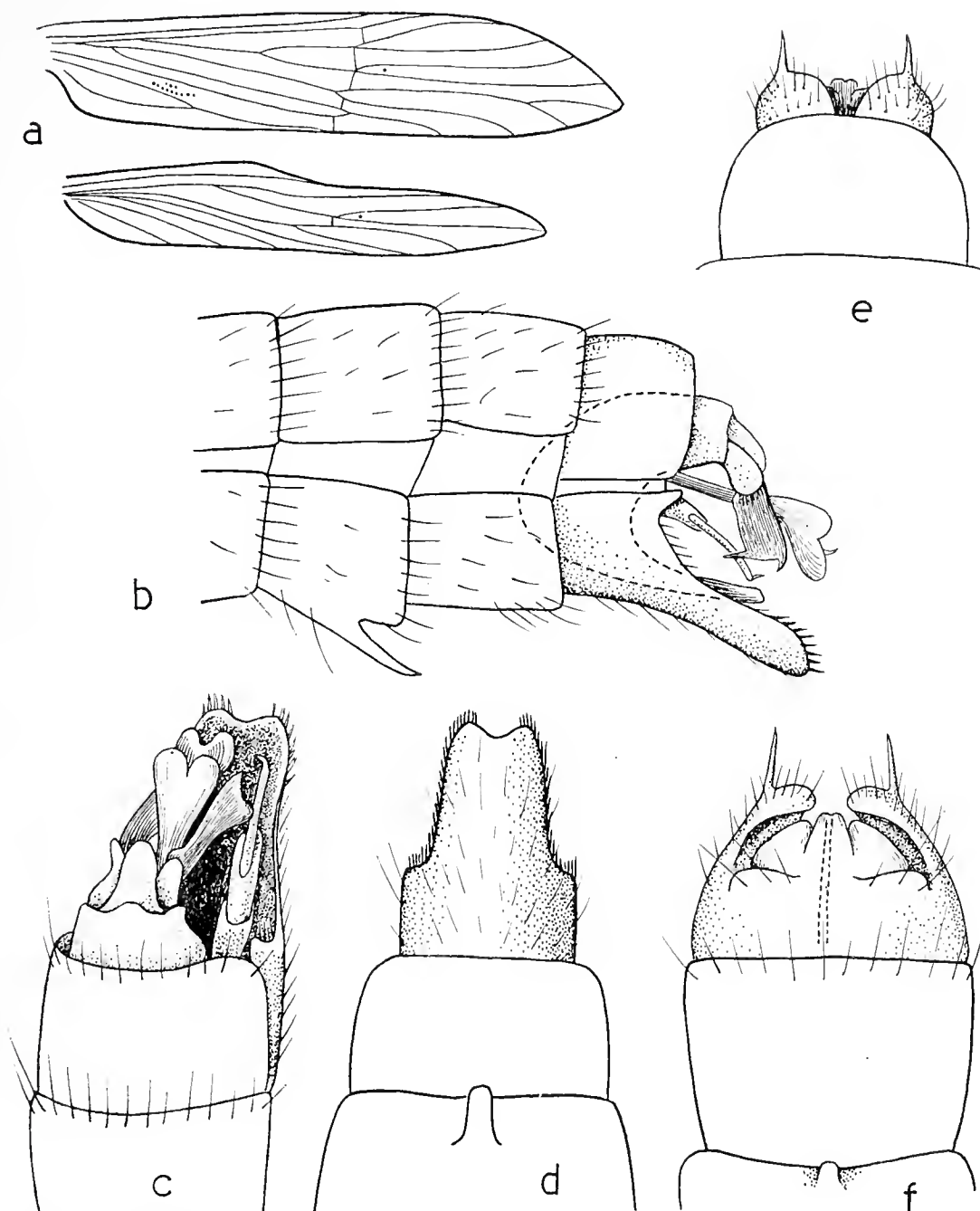


FIG. 4.—*Protoptila tenebrosa* Walk.: a, wings ♂; b, genitalia ♂, lateral, c, obliquely dorsal, d, ventral; e, genitalia ♀, dorsal, f, ventral.

Walker describes the species as follows :

“ *Nigricans* ; antennae fuscae ; pedes testacei ; alae nigro-cinereae.

“ Blackish : antennae brown : legs testaceous : wings blackish gray, fringed ; veins black. Length of the body 1 line ; of the wings 3 lines.

"a-e. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

To this we add :

Genitalia, male.—Terminal dorsal segment produced to a rounded, membranous apex with a strong, transverse and sinuous ridge about midway ; from beneath the produced segment proceeds a pair of intermediate processes, possibly two-jointed, basal joints (?) short, apices much expanded, terminal joints nearly rectangular, each from the side, with a large, strong tooth arising from the lower apical angle directed downward and slightly inward and a much smaller tooth at the upper apical angle, directed downward ; penis greatly dilated at the apex which, from above, appears as a pair of broad, excised plates, one beneath the other, with the apical angles rounded ; from the side, the upper plate is shorter than the lower with a fine, short, upturned hook or spine projecting beyond the apex and directed slightly upward ; stem of the penis rod-like and very slender ; inferior appendages perhaps three-jointed, basal joint short, middle joint long and pencil-shaped, apical joint long, narrow, sinuous and terminating in an upturned hook ; the 9th sternite is furcate, the two forks appearing as long, narrow plates, side by side ; 8th sternite enormously produced to make a long, tapering trough, margins heavily fringed, apex excised and with sharp, distally directed angles on the upper margins towards the base ; ventral process strong and acute from the side, apex rounded from beneath.

Genitalia, female.—Terminal dorsal segment rounded ; below and beyond it are seen two rounded lobes with their apical margins abruptly produced in very acute, narrow processes ; from beneath, the lobes arise from the lateral margins of the segment ; they are narrow at their bases with dilated apices inclining towards each other, the narrow, acute processes arising towards the lateral margins ; between these lobes is a trilobed process of which the central lobe is the broadest ; the central lobe carries a long, slender duct the use of which is unknown ; this duct is present in all the known *Protoptila* species ; a short, blunt process to the antipenultimate segment.

Length of the fore wing, male, 3 mm. ; female, 3.5 mm.

In the description of the species which was given in *Trans. R. Ent. Soc.*, 82, 1934, what was there described as the lower penis-cover is actually the lower margin of the 9th segment ; the large trough there stated to pertain to the terminal sternite is the produced margin of the 8th.

It was also stated that the series contained a specimen without abdomen. A further examination has shown that this is a male, and that the abdomen is present but embedded in the thick gum with which the insects were affixed to the card. Walker's series is therefore complete, and contains two males mounted as microscope slides, one female in a similar condition, and two males gummed to a card.

We here designate as the type the male mounted in balsam to show a slightly oblique dorsal aspect as in the figure.

PHILOPOTAMIDAE.

Trentonius gen. n.

Spurs 2, 4, 4. Female apterous; spurs of the legs differing in size from those of the male as detailed in the specific description.

In the male, the neururation conforms with that of the European genus *Philopotamus*, i. e. forks nos. 1, 2, 3, 4 and 5 present in the fore and nos. 1, 2, 3 and 5 in the hind wings; the three anal veins of the hind wing run free to the main margin, A_1 and A_2 not being fused as in *Dolophilus* and *Wormaldia*.

In the male genitalia the terminal joint of the inferior appendage is single whilst in all the European species of *Philopotamus* this joint is paired. The genus is closely allied to *Dolophilus* in the form of the genitalia.

It is possible that other American species in *Philopotamus* may be better placed in this genus, and this is foreshadowed by McLachlan, who wrote in the *Revision and Synopsis of the European Trichoptera*, in 1878, "although several North American insects have been placed in the genus (agreeing in possessing ocelli and in the colours, etc.), I am not sure that any of them will be retained in it when a more thorough examination of North American Trichoptera shall be effected". This genus may possibly fall to *Dolophilodes* Ulmer of which, however, the female has not been described.

Genotype the following species:

Trentonius distinctus (Walker).

(Figs. 5, 6.)

- 1852. *Philopotamus distinctus* Walker, Cat. Neur. Brit. Mus.: 104.
- 1861. *Philopotamus distinctus* Hagen, Syn. Neur. N. Amer.: 291.
- 1863. *Philopotamus distinctus* McLachlan, Ent. Ann.: 163.
- 1864. *Philopotamus distinctus* Hagen, Verh. Zool. Bot. Ges. Wien, 14: 855.
- 1878. *Philopotamus distinctus* McLachlan, Rev. and Syn. Trich.: 381.
- 1892. *Philopotamus distinctus* Banks, Trans. Amer. Ent. Soc., 19: 367.
- 1906. *Philopotamus distinctus* Ulmer, Notes Leyden Mus., 28: 88, fig. 90.
- 1907. *Philopotamus distinctus* Ulmer, Genera Insect., fasc. 60a: 197.
- 1907. *Philopotamus distinctus* Banks, Cat. Neur. Ins. U.S.: 48.
- 1914. *Philopotamus distinctus* Banks, Can. Ent., 46: 253, pl. 10, fig. 30.
- 1926. *Philopotamus distinctus* Sibley, Bull. Lloyd Library, no. 27, Ent. Ser. 5: 103.
- 1933. *Philopotamus distinctus* Carpenter, Psyche, 40: 44.
- 1934. *Philopotamus distinctus* Betten, N.Y. State Mus. Bull., 292: 167, pl. 15, figs. 7-12.
- 1934. *Dolophilodes distinctus* Martynov, Trichoptera Annulipalpia of the U.S.S.R.: 174. 332.
- 1936. *Philopotamus distinctus* Milne, St. N. Amer. Trich., 3: 83.

Walker describes the species as follows:

"Niger; palpi et pedes obscure testacei; alae anticae fusco-cinereae flavo confertim guttatae, posticae cinereae.

"Black, clothed with black and yellow hairs: antennae very much longer than the body: palpi and legs dull testaceous: wings gray: fore-wings tinged with brown, adorned with numerous pale yellow dots of various size. Length of the body 2 lines; of the wings $5\frac{1}{2}$ lines.

"a-d. Trenton Falls, New York. Presented by E. Doubleday, Esq."

To this we add the following :

Head (as seen in a paratype) dark brown to black, with two small bunches of tawny hairs between the ocelli, posterior angles somewhat lighter and

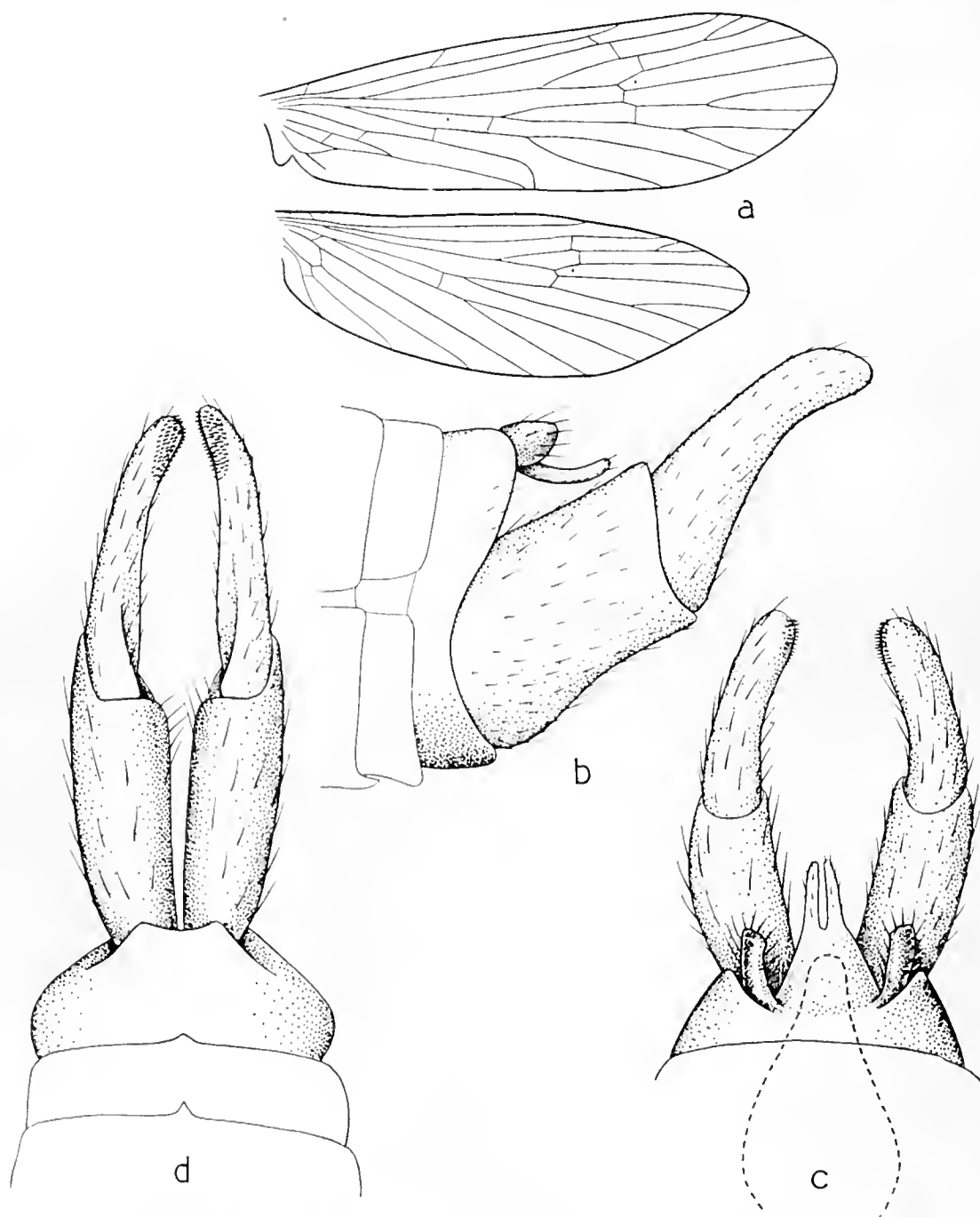


FIG. 5.—*Trentonius distinctus* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

covered with black hairs; *antennae* brown, the tips of the joints somewhat darker; meso- and metanotum dark brown to black, practically nude; *legs* brown, the femur of the hind pair appearing paler than the other femora and

paler than its own tarsi and spurs; *fore wings* brown, with pale spots scattered over the entire surface, the anal veins with conspicuous black bristles.

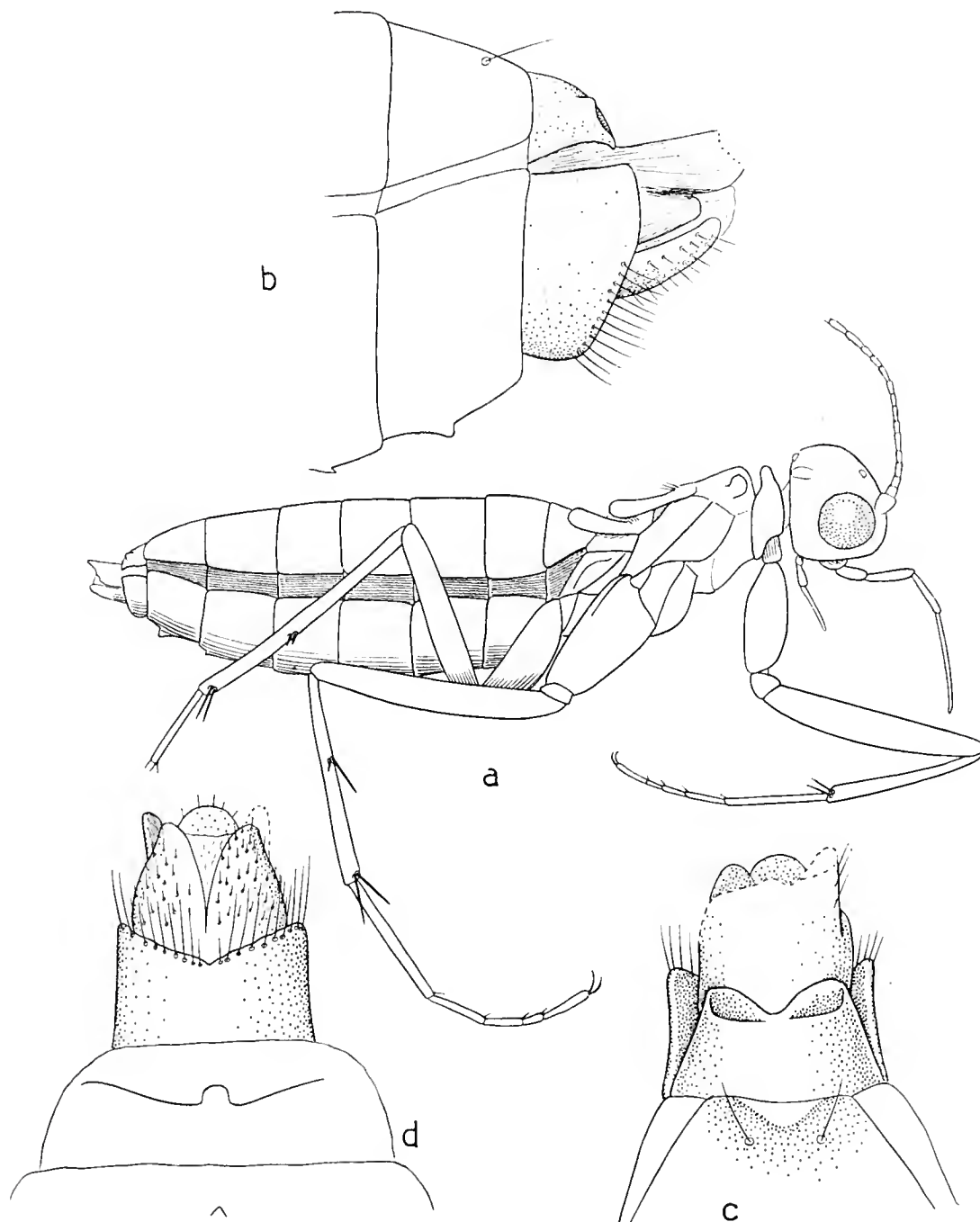


FIG. 6.—*Trentonius distinctus* Walk. ♀: *a*, lateral aspect; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

Length of the fore wing, male, 8 mm.

Genitalia, male.—The dorsal plate, or perhaps it may be the upper penis-cover, triangular and yellowish, apex produced in a pair of parallel fingers; on

each side is a moderately small, dark superior appendage, somewhat triangular from the side; penis membranous, concealed beneath the dorsal plate; inferior appendages two-jointed, terminal joint about the same length as the basal joint; seen from the side the lower margin concave, the inner surfaces at the apices set with a mass of short setae: the centre of the margin of the 9th sternite slightly produced and excised; a small, wide process to the 8th sternite and an equally wide but rather more acute one to the 7th.

Genitalia, female.—The apical margin of the 8th tergite is sharply excised with a transverse ridge at the base of the excision; the pigmentation of the 7th tergite simulates a corresponding excision, though the actual margin appears to be entire; there are two stiff bristles arising from hyaline spots on each side and below this false excision; the 8th tergite is separated from the 8th sternite by a rather deep, lateral excision; the 9th tergite is produced in a pair of triangular processes, damaged and partly wanting in the allotype; from beneath, the sternite is widely excised; there is a small, rectangular process on a suture towards the apical margin of the 7th sternite and a still smaller one on the 6th.

It should be noted with regard to the apterous female that the tibial spurs are smaller than in the male; of the subapicals of the middle legs, the outer one is very small, and the subapicals of the hind pair are both minute, the outer smaller than the inner. The wings are reduced to small scales, both fore and hind pairs bearing a few stiff bristles on the posterior margins at the base.

Milne (1936) synonymizes *Philopotamus americanus* Banks (1895) with *P. distinctus* Walker. Banks does not agree. As there remains doubt, therefore, we do not here include *P. americanus* in the synonymy of *P. distinctus*.

There were originally in the Museum collection four specimens collected by Edward Doubleday. One of these, probably the one described by Dr. Ulmer, is a male without abdomen, one is an apterous female, and one a male without a head; the last referred to is here designated the type, and the abdomen has been mounted in canada balsam. The fourth specimen is missing.

The association of the apterous female with the male may doubtless be assumed from Doubleday's notes (*Ent. Mag.*, 5, 379), made for the 31st October, 1837:

"It was a glorious day,—the sun bright and calm. The frost had spread a white mantle over the trees within reach of the spray: from the 'shower-bath-rock' hung icicles, which you might have taken for stalactites. Yet had the sun power to awaken into life some little *Philopotomi*, which were running about on the rocks. I saw in one place a great bustle amongst them; eight or ten were huddled together and were apparently very contentious and quarrelsome; the object of their strife I found to be an apterous female; I carefully searched for more, but found only four or five, there being at least ten males to one female."

It was a disappointment not to be able to duplicate Doubleday's catch in October, 1937. The gorge was found to be occupied by a large power plant, and natural conditions quite obliterated.

Chimarrha braconoides (Walker).

(Fig. 7.)

- 1860. *Curgia braconoides* Walker, Trans. Ent. Soc. Lond., (2) 5 : 179.
- 1864. *Curgia braconoides* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 810.
- 1866. *Curgia braconoides* McLachlan, Trans. Ent. Soc. Lond., (3) 5 : 277.
- 1879. *Curgia braconoides* McLachlan, Rev. and Syn. Trieh.: 430-431.
- 1884. *Curgia braconoides* Kolbe, Berlin. Ent. Zeit., 28 : 167.
- 1906. *Chimarrha braconoides* Ulmer, Notes Leyd. Mus., 28 : 94, fig. 101.
- 1907. *Chimarrha braconoides* Ulmer, Genera Insect., fasc. 60a : 200.
- 1934. *Chimarrha braconoides* Betten, N.Y. State Mus. Bull., 292 : 176.

Walker erected the genus *Curgia* to take this species. He included the characters partly in the generic and partly in the specific descriptions as follows :

Generic description :

"*Foem. Corpus nudum ; palpi longi, arcuati, decumbentes ; articulus 1 us brevis ; 2 us longus, apice unispinosus ; 3 us 2o brevior ; 4 us 3i dimidio non longior ; antennae setaceae, compactae, corpore paullo longiores ; tibiae posteriores calcaribus duobus longis apicalibus ; tibiae mediae calcare uno medio ; tibiae postica calcaribus duobus mediis ; alae anticae angustae.*

"Female. Body, legs, and wings bare : palpi long, curved decumbent, much longer than the breadth of the head ; 1st joint short ; 2nd long with a spine at the tip ; 3rd much shorter than the 2nd ; 4th about half the length of the 3rd ; antennae setaceous, a little longer than the body : sutures of the joints hardly visible ; posterior tibiae with two long apical spurs ;* middle tibiae with one middle spur ; hind tibia with two middle spurs : fore wings narrow ; six apical veins ; 1st and 2nd forks of one vein, which is a fork of the radial vein ; 3rd and 4th forks of one vein, which, and the 5th are forks of a discal vein ; 6th simple."

Then followed Walker's description of the species :

"*Foem. Luteo-rufa, palpis, antennis, tibiis tarsisque nigris, alis nigricantibus anticis albido novem-maculatis et bifasciatis.*

"Female. Luteous-red : palpi, antennae, tibiae and tarsi black ; wings blackish ; fore-wing with seven whitish spots between the base and the middle, and with two exterior discal whitish spots, which are between two whitish bands ; 1st band abbreviated in front ; 2nd much abbreviated hindward. Length of the body $2\frac{1}{2}$ lines ; of the wings 6 lines. St. Domingo."

We add :

Head, thorax and abdomen yellow ; antennae broken but the remaining joints stout, the basal joint globular and larger than the others, yellow, the

* Walker evidently intends to refer to the anterior tibiae and not the posterior.

other joints black; palpi with the 1st joint short, yellow, the others dark brown, the 2nd joint long, slightly curved, with conspicuous stout bristles at its distal end, the 3rd shorter than the 2nd, the 4th half as long as the 3rd, the 5th nearly as long as the 3rd and more slender; *fore leg* (but one remains) with the terminal tarsal joint greatly enlarged and carrying a single very large claw; spurs 1, 4, 4; *fore wings* dark brown to black with two

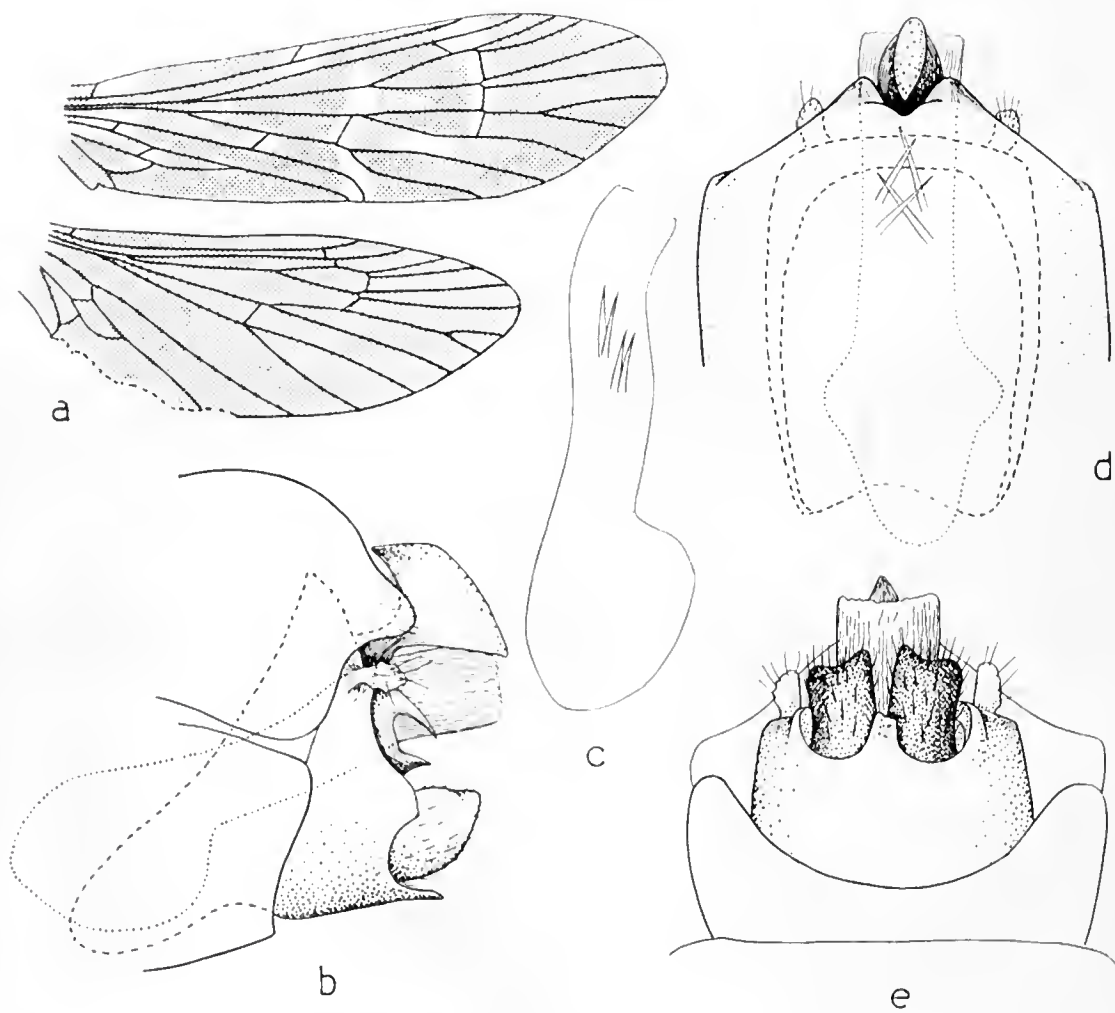


FIG. 7.—*Chimarrha braconoides* Walk. ♂: *a*, wings; *b*, genitalia, lateral; *c*, penis, lateral; *d*, genitalia, dorsal, *e*, ventral.

transverse white bands, one extending from M_{3+4} at the level of the cross-vein of the sector to the costal margin of the wing, where it is somewhat widened, the other running in a somewhat sinuous path from the apex of the discal cell through cross-vein $m-cu$ to the tips of the anal veins at the posterior margin; in addition to these bands, there are white dots scattered over the base of the wing, and one is located in cell M_4 ; venation as in other species of *Chimarrha*, including the characteristic formation of the anal veins of the *hind wing*; median cell of the fore wing not as much reduced as in other North

American species, the nude spot less conspicuous and not accompanied by an arching of the radial sector.

Length of the fore wing, male, 7.5 mm.

Genitalia, male.—From above, the apical margin of the 8th tergite is deeply excised to leave a pair of prominent, triangular projections; in and above the excision is a large dorsal process, pertaining to the 9th segment, of which the dorsal margin is completely withdrawn into the 8th; this process, seen from the side, has a narrow stem and is then enormously dilated, the upper angle acute and turned back over the 8th segment, the lower or outer angle also acute and directed distally; upper margin convex, lower margin straight; superior appendages very small; from the side, apices clavate; scarcely visible from above; penis, in a tubular sleeve, is armed on each side with a pair of black spines directed inwards; there is a paired process, possibly a lower penis-cover, which, from the side, is bifurcate, the forks slender and separated from each other by an obliquely U-shaped excision; inferior appendages, from the side, almost triangular with a convex lower margin; from beneath they are rectangular, apices truncate, inner angles slightly produced; margin of the 9th sternite strongly produced at its centre to make a ventral process; margin of the 8th sternite widely and roundly excised; there is a pair of reniform, brownish plates towards the lateral margins of the 5th sternite.

Some doubt has remained regarding the number of spurs in this insect. The wording of the original description is evidently confused, and McLachlan, while at first (1866) stating that there are no spurs on the fore legs, later found it impossible to be positive about it. A microscope preparation has been made which leaves no doubt that a single spur is present on the fore leg, but it is very small. We are unable to state whether the presence of but a single claw on the fore leg is normal in this species.

There is a single male type; both Walker and McLachlan were mistaken in recording it as a female.

***Chimarrha obscura* (Walker).**

(Fig. 8.)

- 1852. *Beraea ? obscura* Walker, *partim*, Cat. Neur. Brit. Mus. : 121.
- 1861. *Chimarrha obscura* Hagen, Syn. Neur. N. Amer. : 297.
- 1911. *Wormaldia plutonis* Banks, Trans. Amer. Ent. Soc., 37 : 358, fig. 34.
- 1934. *Chimarrha lucia* Betten, N.Y. State Mus. Bull., 292 : 175, pl. 16, figs. 10-12.
- 1938. *Chimarrha plutonis* Ross, Psyche, 45 : 7 (reduces *lucia* to synonymy under *plutonis*; lectotype of *plutonis* designated).

Walker describes the species as follows :

“*Nigricans, fusco-hirta ; pectus et abdomen ferruginea ; pedes testacei ; alae nigro-fuscae, ciliatae.*

“Blackish, thickly clothed with brown hairs : antennae black : breast and abdomen ferruginous : legs testaceous : wings blackish brown, deeply fringed. Length of the body $1\frac{1}{2}$ line[s] ; of the wings 4 lines.

"a, b. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

To this we add :

Genitalia, male.—Apical margin of the 8th tergite somewhat depressed at its centre ; apical margin of the 9th tergite produced in a rectangular, membranous dorsal plate with a shallow, excised apical margin ; there is a pair of

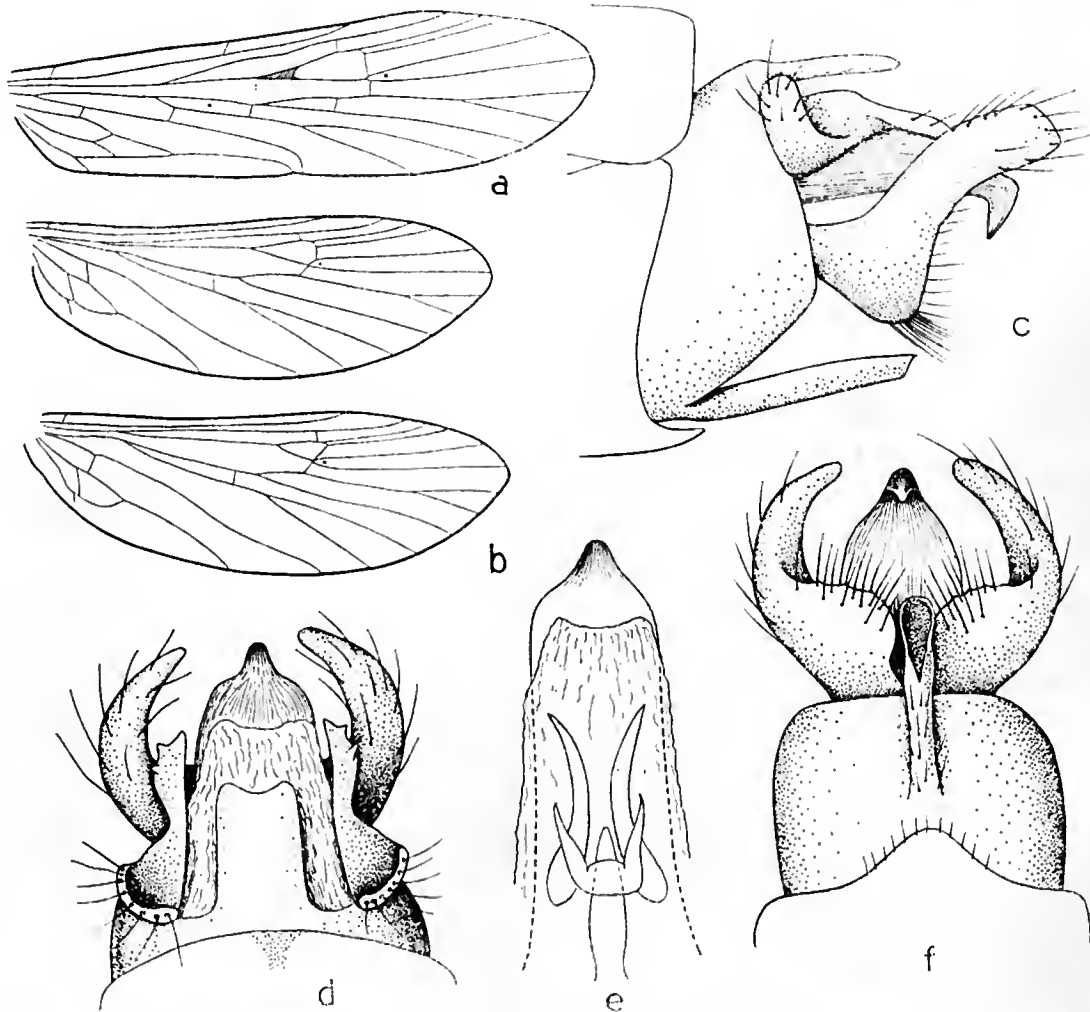


FIG. 8.—*Chimarrha obscura* Walk. ♂ : a, wings (from a specimen of the synonym *C. lucia* Betten); b, posterior wing (from the type); c, genitalia, lateral, d, dorsal; e, lower penis-cover and penis, showing spines, dorsal; f, genitalia, ventral, superior appendages not shown.

superior appendages which, from above, are fairly broad at the base which is upturned in a narrow ridge, fringed along its margins ; midway along the outer margin is a deep, angular excision ; the apex is serrate and dilated on the outer margin, the inner margin of the appendage being straight from base to apex ; from the side, the base of the appendage is elevated along its upper and outer margin in a rounded hump ; penis membranous, with various sheaths and spines which are rather obscure ; lower penis-cover strongly chitinized, broad

from above, narrowing at the apex, which, from the side, is down-turned in a strong hook; inferior appendages from beneath, broad at the base, caliper-shaped; from the side, shaped like a rather long shoe; a long ventral process to the 9th sternite, with a scoop-shaped apex from beneath; a short, wide process to the 8th, rather acute from the side.

Length of the hind wing, male, 4.25 mm.

What remains of the type hardly permits us to add to Walker's general description, since both the fore wings are wanting; figures of wings from an example in the Betten collection are therefore given to illustrate the species further.

The species described by Betten under the name *Chimarrha lucia* is the same as *obscura* Walker, the type of which is here designated. Since Ross has more recently found *plutonius* Banks equivalent to *lucia*, it also must be reduced to synonymy.

As has already been noted (p. 8), Walker drew his description of *Beraea* ? *obscura* from two specimens from the Hudson's Bay region; one of these we designate as the type of the species now named *Chimarrha obscura*, and the other we describe as new under the name *Synagapetus walkeri* (p. 7).

In addition to these two examples, *a* and *b*, mentioned by Walker, we find a third, a true *Beraea*, bearing the label "W. W. Saunders." The specimen bears also the British Museum registration label "68-3" indicating that it was received in the year 1868. It cannot therefore have formed a part of the Walker type series. It bears no locality label, and there is no evidence that it is American. Unfortunately this example is a female and not recognizable.

Milne's position (*St. N. Amer. Trich.*, 3 : 57) in regarding *Beraea nigrutta* Banks as a synonym of *obscura* is not tenable. If any one of the three specimens found in the Museum collection under the label "*obscura*" is *nigrutta*, it can presumably only be the one bearing the "W. W. Saunders" label.

HYDROPSYCHIDAE.

Hydropsyche alternans (Walker).

- 1852. *Philopotamus alternans* Walker, Cat. Neur. Brit. Mus. : 104.
- 1852. *Philopotamus indecisus* Walker, Cat. Neur. Brit. Mus. : 104.
- 1861. *Hydropsyche alternans* Hagen, Syn. Neur. N. Amer. : 288.
- 1861. *Hydropsyche indecisa* Hagen, Syn. Neur. N. Amer. : 288 (suggests identity of *alternans* and *indecisa*).
- 1863. *Hydropsyche alternans* McLachlan, Ent. Ann. : 159, 163 (*indecisa* reduced to synonymy).
- 1864. *Hydropsyche alternans* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 821.
- 1892. *Hydropsyche alternans* Banks, Trans. Amer. Ent. Soc., 19 : 367.
- 1907. *Hydropsyche alternans* Ulmer, Genera Insect., fasc. 60a : 170.
- 1907. *Hydropsyche alternans* Banks, Cat. Neur. Ins. U.S. : 47.
- 1909. *Hydropsyche alternans* Vorhies, Trans. Wisc. Acad. Sci., 16 : 707, pl. 60, figs. 7-10.
- 1933. *Hydropsyche alternans* Carpenter, Psyche, 40 : 43, fig. 1.
- 1934. *Hydropsyche alternans* Betten, N.Y. State Mus. Bull., 292 : 185, pl. 18, figs. 1-7.
- 1936. *Hydropsyche alternans* Milne, St. N. Amer. Trich., 3 : 73.

Walker describes *Philopotamus alternans* as follows :

“ *Niger, cano-hirtus ; antennis basi, abdominis segmentis apice pedibusque fulvis ; alae anticae fuscae, cano confertim irroratae, posticae cinereae.* ”

“ Black, clothed with hoary hairs : antennae tawny at the base : hind borders of the abdominal segments and legs tawny : fore-wings brown, mostly thickly covered with hoary dots ; hind-wings gray. Length of the body $3\frac{1}{2}$ lines ; of the wings 11 lines.

“ *a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.”

And *Philopotamus indecisis* :

“ *Nigricans, subtus testaceus ; antennae testaceae, fusco annulatae ; pedes testacei ; alae cinereae, anticae confertim flavo guttatae.* ”

“ Blackish, testaceous beneath : palpi testaceous, tawny towards the base : antennae testaceous, with a brown ring on each joint : legs testaceous : wings gray ; fore-wings slightly brown, adorned with numerous pale yellow dots of various size. Length of the body 3 lines ; of the wings $10\frac{1}{2}$ lines.

“ *a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.

“ *b.* Nova Scotia. From Lieut. Redman's collection.”

We add to Walker's description of *alternans* as follows :

Head with some tawny hair at the posterior angles ; *antennae* with alternating pale and somewhat narrower brown annulations ; *legs* and spurs yellowish ; *fore wings* brown, covered throughout with black and with white hair, arranged in very small patches ; there is a dark area at the tips of the anal veins, with a conspicuous white area on either side, another dark area on the posterior margin at the middle of the wing, some white spots along the apical margin extend rather conspicuously into the marginal fringe ; the dark fleck near the tip of R_2 , not uncommon in this genus, is present.

Length of the fore wing, 11 mm.

The type of *alternans* is a female.

There are two examples of *indecisis* in Walker's series, *a*, from Hudson's Bay, and *b*, from Nova Scotia.

We designate as the type of *indecisis* the specimen *a* with the Hudson's Bay label. It is a female agreeing closely with the type of *alternans*, and we concur in the judgment of Hagen and McLachlan that these two are of the same species. The type of *indecisis* shows a brighter brown in the pubescence of the wings, and the ends of the tarsal joints are clearly tipped with brown.

Length of the fore wing, 10 mm.

A third female specimen, Walker's *b* of *indecisis*, from Nova Scotia, also agrees closely with the type of *alternans*.

Hydropsyche morosa Hagen has, at its author's suggestion, been regarded as a synonym of *alternans*. This is very possibly correct, but we judge it best to list the species separately until both males and females of the genus are more thoroughly known.

In trying to connect the Walker female types in the genus *Hydropsyche* with

American species of which the males are known, we have had the benefit of the opinion of Dr. H. H. Ross, who has studied the former more fully than anyone else, and our common judgment is that we have no basis at present for final identification of these types with the known species of later description. The species figured as *alternans* by Vorhies (1909) and by Betten (1934) may very well be *alternans* Walker, and the same may be said of *H. morosa* Hagen; *H. walkeri* (*maculicornis* W.) might also come into consideration, though most specimens of this species that we have seen are smaller than the Walker type of *alternans*.

Hydropsyche confusa (Walker).

- 1852. *Philopotamus confusus* Walker, Cat. Neur. Brit. Mus. : 103.
- 1861. *Philopotamus confusus* Hagen, Syn. Neur. N. Amer. : 291.
- 1863. *Hydropsyche confusa* McLachlan, Ent. Ann. : 160, 163.
- 1864. *Hydropsyche confusus* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 821.
- 1892. *Hydropsyche confusa* Banks, Trans. Amer. Ent. Soc., 19 : 367.
- 1907. *Hydropsyche confusa* Ulmer, Genera Insect., fase. 60a : 171.
- 1907. *Hydropsyche confusa* Banks, Cat. Neur. Ins. U.S. : 47.
- 1934. *Hydropsyche confusa* Betten, N.Y. State Mus. Bull., 292 : 193.

Walker describes the species as follows :

"*Niger, cano-pilosus ; antennis basi testaceo annulatis ; abdomine subtus, palpis, pedibusque testaceis ; alae cinereae, anticae obsolete irroratae.*

"Black, clothed with hoary hairs : palpi, abdomen beneath and legs dull testaceous : wings gray ; fore-wings very indistinctly covered with pale dots ; veins black. Length of the body 3 lines ; of the wings 11 lines.

"*a. Arctic America. District watered by the Mackenzie and Slave Rivers. Presented by Sir J. Richardson.*"

There is only a single female example of the species in the collection, as indicated by Walker ; it is evidently badly rubbed ; there are a few short, pale hairs on the fore wings and a very faint indication of the pale spots near the tips of the anal veins ; this specimen is like the type of *reciproca* in showing pale spots in the wing membrane along the costal margin.

Length of the fore wing, 11 mm.

Dr. Ross has called our attention to the fact that while not specifically diagnostic, the shape and setation of the 8th tergite and sternite of the females may serve to differentiate certain groups of species in the genus. By this criterion there are but three known species which could be the same as *H. confusa* Walker, namely, *H. depravata* Hagen, *H. betteni* Ross, and *H. separata* Banks. Between these three we cannot judge, since the females of these species have not yet been differentiated.

Hydropsyche dubia Walker.

- 1852. *Hydropsyche dubia* Walker, Cat. Neur. Brit. Mus. : 112.
- 1861. *Hydropsyche dubia* Hagen, Syn. Neur. N. Amer. : 288.

Walker describes the species as follows :

" *Nigra, subtus testacea ; antennae pallide testaceae, fusco annulatae ; palpi ferruginei ; pedes testacei ; alae anticae subfuscae obsolete irroratae, posticae subcinereae.*

" Black, testaceous beneath : antennae pale testaceous, with a brown ring on each joint, and wholly brown towards the tips : palpi ferruginous : legs testaceous : fore-wings slightly brown, indistinctly covered with pale dots : hind-wings pale gray. Length of the body 3 lines ; of the wings 11 lines.

" *a.* North America ? Presented by the Entomological Club."

To this we add :

The *wings* are largely denuded, and show but faintly the light and dark areas on the posterior margin, often found in this genus. There are no transparent spots apparent in the wing membrane such as occur in some other species.

Length of the fore wing, 10 mm.

There is a single female type-specimen.

In 1863 McLachlan (*Ent. Ann.*, 163) quoted Hagen's opinion that *dubia* might be the same as *reciproca* (see below). McLachlan then listed *dubia* as a synonym, and in this he has been followed by Hagen, and by all subsequent writers on American forms. Considering the close similarity of the many species in this genus described from male specimens, we prefer to list these two species separately.

We are unable to relate any of the known American forms specifically with the Walker type.

***Hydropsyche reciproca* (Walker).**

- 1852. *Philopotamus reciprocus* Walker, Cat. Neur. Brit. Mus. : 104.
- 1861. *Hydropsyche reciproca* Hagen, Syn. Neur. N. Amer. : 288.
- 1863. *Hydropsyche reciproca* McLachlan, Ent. Ann. : 160, 163.
- 1864. *Hydropsyche reciproca* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 823.
- 1892. *Hydropsyche reciproca* Banks, Trans. Amer. Ent. Soc., **19** : 367.
- 1907. *Hydropsyche reciproca* Ulmer, Genera Insect., fasc. **60a** : 171.
- 1907. *Hydropsyche reciproca* Banks, Cat. Neur. Ins. U.S. : 47.
- 1934. *Hydropsyche reciproca* Betten, N.Y. State Mus. Bull., **292** : 189.
- 1936. *Hydropsyche reciproca* Milne, St. N. Amer. Trich., **3** : 61.

Walker describes the species as follows :

" *Nigricans ; antennis pedibusque testaceis ; palpi ferruginei, basi nigri ; alae anticae subfuscae, flavo confertim irroratae, posticae subcinereae.*

" Blackish : palpi ferruginous, black towards the base : antennae and legs testaceous : fore-wings slightly brown, with numerous pale yellow dots of various size ; hind-wings pale brown. Length of the body 3 lines ; of the wings 13 lines.

" Closely allied to *P. indecisus*.

" *a.* North America ? Presented by the Entomological Club."

To this we add :

The type is a female specimen lacking the *antennae* and the middle *legs* ; the *wings* are practically denuded, but show traces of the not uncommon

arrangement of light and dark areas on the posterior margin ; there are many transparent spots in the wing membrane along the costal margin.

This is the largest example of a North American *Hydropsyche* species in the collection ; the fore wing is 14 mm. in length.

***Hydropsyche walkeri* n. nom.**

(Fig. 9.)

- 1852. *Hydropsyche maculicornis* Walker, Cat. Neur. Brit. Mus. : 113.
- 1861. *Hydropsyche maculicornis* Hagen, Syn. Neur. N. Amer. : 289.
- 1863. *Hydropsyche maculicornis* McLachlan, Ent. Ann. : 163.
- 1864. *Hydropsyche maculicornis* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 823.
- 1892. *Hydropsyche maculicornis* Banks, Trans. Amer. Ent. Soc., **19** : 367.
- 1907. *Hydropsyche maculicornis* Ulmer, Genera Insect., fasc. **60a** : 171.
- 1907. *Hydropsyche maculicornis* Banks, Cat. Neur. Ins. U.S. : 47.
- 1934. *Hydropsyche maculicornis* Betten, N.Y. State Mus. Bull., **292** : 188.
- 1934. *Hydropsyche* sp. 1 Betten, N.Y. State Mus. Bull., **292** : 192, pl. 20, figs. 1, 2.
- 1936. *Hydropsyche alternans* Milne, *partim*, St. N. Amer. Trich., **3** : 73 (*maculicornis* W. is listed as synonym of *alternans* W.).

Walker describes the species as follows :

“ *Nigricans* ; *antennae testaceae, fusco annulatae* ; *pectus ferrugineum* ; *pedes testacei* ; *alae anticae fusco-cinereae obsolete irroratae* ; *posticae cinereae*.

“ Blackish, hairy : antennae testaceous, with a brown ring on each joint : palpi tawny : breast ferruginous : legs testaceous : fore-wings brownish-gray, with numerous indistinct pale dots : hind-wings gray. Length of the body 2 lines ; of the wings 7 lines.

“ *a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.”

To this we add :

Head nearly nude above, with a few short, white hairs and longer hair posteriorly ; *antennae* broken ; the joints remaining show distinct annulations of dark brown alternating with pale ; *thorax* and *legs* light brown ; *fore wings* apparently rubbed, almost uniformly light brown, with some lighter spots along the margin at the tips of the costa and R_1 , and a larger spot at the tips of the anal veins ; a small dark fleck in cell R_2 , as is not uncommon in species of this genus.

Length of the fore wing, male, 6.5 mm.

Genitalia, male.—The 9th dorsal segment produced in a large dorsal plate, of which the apical angles are produced, and from above, dilated and incurved at their apices ; from the side, produced in a stout, downwardly directed finger ; there is an upper part to the dorsal plate with a minute excision in the apical margin from above, somewhat triangular from the side ; from this aspect there is a second triangular projection covered with stout bristles midway towards the apex ; the lateral margin of the 9th segment is produced in a bluntly triangular side-piece ; penis, from above, straight, with a heart-shaped dorsal process before the apex ; this from the side appears as a thick tongue

directed distally ; on each side, at the base, is a stout, sinuous and rather short spur directed distally ; on the latero-ventral side is a pair of short, cylindrical processes, apices fringed with a few stout bristles ; the apex of the penis forms a cup with two divergent bunches of bristles lying in it, the apices of the bristles projecting just beyond its lower margin ; inferior appendages with a very long basal and short apical joint.

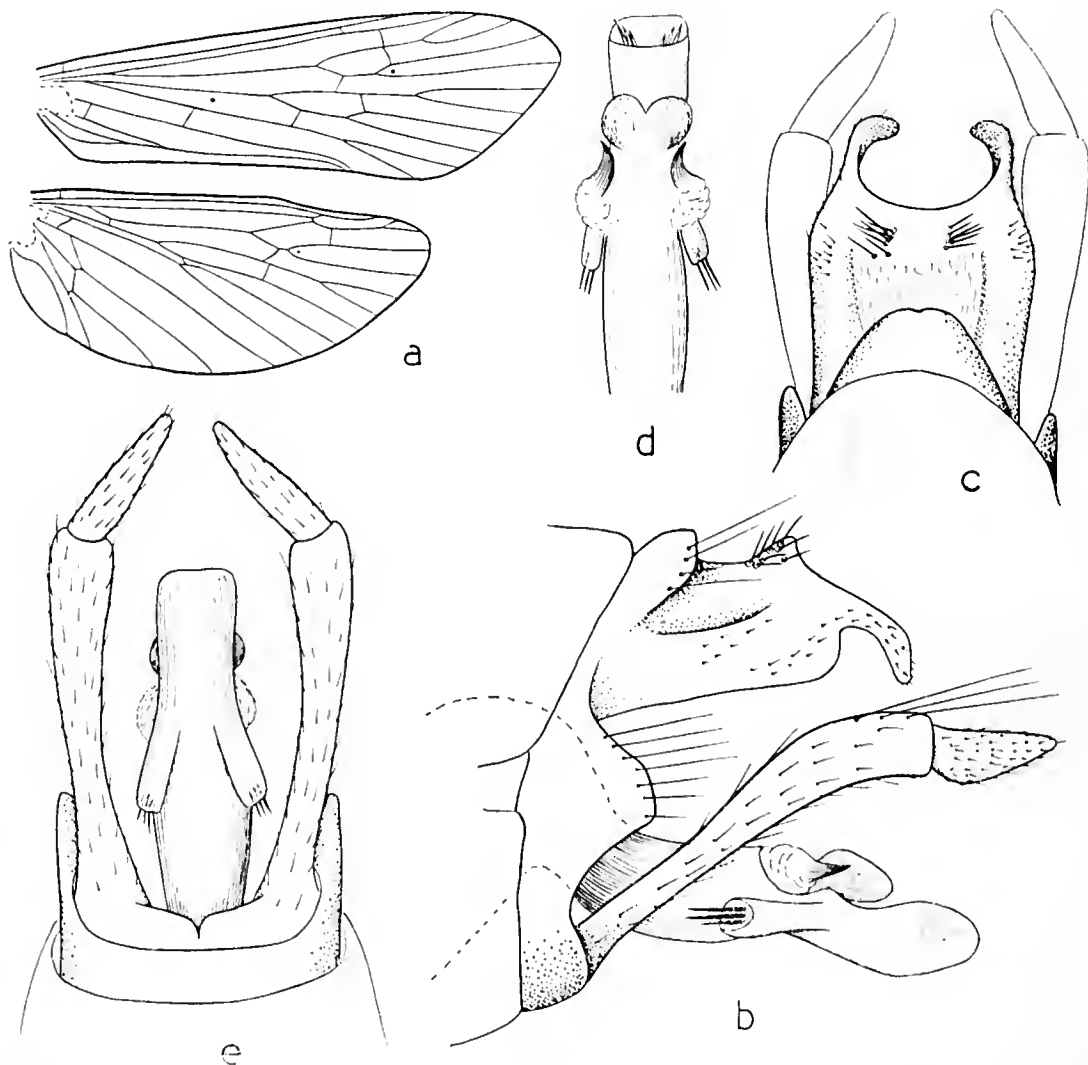


FIG. 9.—*Hydropsyche walkeri* n. nov. ♂ : a. wings ; b. genitalia, lateral, c, dorsal ; d penis, dorsal ; e, genitalia, ventral.

There is but one specimen, a male, lacking the greater part of the antennae, the palpi, and the middle legs.

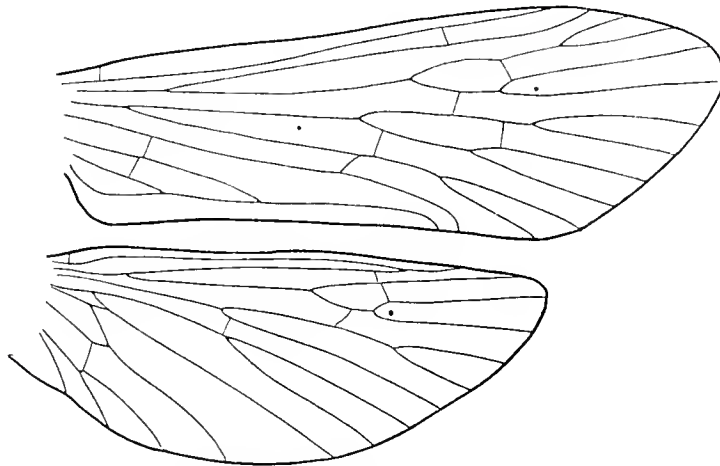
This is the species figured by Betten (1934) as *Hydropsyche* no. 1.

The name *maculicornis* is preoccupied by Pictet, *Tinodes maculicornis*, subsequently found to be a *Hydropsyche*. Accordingly, Walker's species has been renamed.

Cheumatopsyche robusta (Walker.)

(Fig. 10.)

1852. *Hydropsyche robusta* Walker, Cat. Neur. Brit. Mus. : 114.
 1861. *Hydropsyche robusta* Hagen, Syn. Neur. N. Amer. : 289.
 1863. *Hydropsyche robusta* McLachlan, Ent. Ann. : 163.
 1864. *Hydropsyche robusta* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 823.
 1892. *Hydropsyche robusta* Banks, Trans. Amer. Ent. Soc., 19 : 367.
 1904. *Polycentropus robusta* Banks, Proc. Ent. Soc. Wash., 6 : 213.
 1907. *Hydropsyche robusta* Ulmer, Genera Insect., fasc. 60a : 171.
 1907. *Holocentropus robusta* Banks, Cat. Neur. Ins. U.S. : 48.
 1934. *Holocentropus robustus* Betten, N.Y. State Mus. Bull., 292 : 223.

FIG. 10.—*Cheumatopsyche robusta* Walk. ♀ : wings.

Walker describes the species as follows :

“*Ferruginea; antennis palpis pedibusque testaceis; thorax piceo bivittatus; alae cinereae, anticae irroratae.*”

“*Ferruginous, hairy; palpi, antennae and legs testaceous; thorax with a broad pitchy stripe on each side; wings gray, clothed with yellowish down; fore-wings with pale dots, which are most distinct along the border; veins brown. Length of the body 2 lines; of the wings 8 lines.*”

“*a, b. North America? Presented by the Entomological Club.*”

To this we add :

Head, dark yellowish brown above; *oculi* of the same shade; *antennae*, of which only a small portion of one remains, yellowish; *median leg* (only one remaining) undilated; *palpi, legs, abdomen, wings* all bleached to the same shade of light yellowish brown. The whole insect is covered with a thin film of yellowish mould and there is no trace of any pattern left on either of the fore wings.

Length of the fore wing, 6 mm.

Of the two examples mentioned by Walker only one remains, a female, and this bears neither locality nor Entomological Club label. The specimen is in

poor condition and, as stated above, affected by mould ; one posterior wing is stuck to the abdomen, and both posterior and one median leg are wanting.

Macronema transversum (Walker).

(Fig. 11.)

1852. *Hydropsyche transversa* Walker, Cat. Neur. Brit. Mus. : 114.
 1861. *Hydropsyche transversa* Hagen, Syn. Neur. N. Amer. : 289.
 1863. *Hydropsyche transversa* McLachlan, Ent. Ann. : 163.
 1864. *Hydropsyche transversa* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 824.
 1866. *Macronema transversum* McLachlan, Trans. Ent. Soc. Lond., (3) 1 : 264.
 1892. *Macronema transversa* Banks, Trans. Amer. Ent. Soc., 19 : 367.
 1906. *Macronema transversum* Ulmer, Notes Leyd. Mus., 28 : 77, fig. 77.
 1907. *Macronema transversum* Ulmer, Genera Insect., fasc. 60a : 164.
 1907. *Macronema transversa* Banks, Cat. Neur. Ins. U.S. : 47.
 1908. *Macronema transversum* Ulmer, Coll. Selys., fasc. 6 (2) : 83, fig. 88, pl. 3, fig. 21.
 1934. *Macronema transversum* Betten, N.Y. State Mus. Bull., 292 : 205.
 1936. *Macronema transversum* Milne, St. N. Amer. Trich., 3 : 72, 74 (lists *M. polygrammatum* McLachlan as synonym).

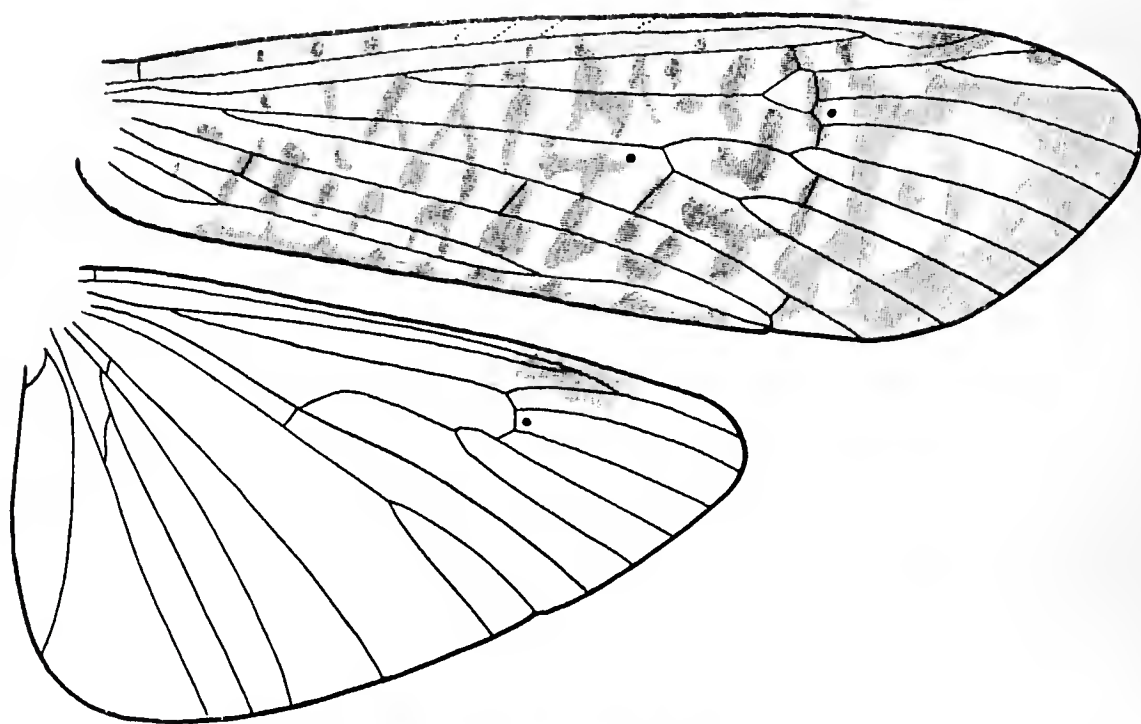


FIG. 11.—*Macronema transversum* Walk. ♀ : wings.

Walker describes the species as follows :

“*Testacea ; antennae nigrae, basi testaceae ; abdomen nigrum, marginibus posticis albidis ; pedes albi ; alae albae, anticae guttis apicibusque subcinereis ad costam flavescentes.*”

"Testaceous : antennae black, very slender, testaceous towards the base : abdomen black ; hind borders of the segments whitish : legs white : wings whitish ; fore-wings yellowish on the fore border and along some of the longitudinal veins, adorned with numerous transverse pale gray marks, some of which are confluent ; tips pale gray, with some whitish marks ; veins pale yellow. Length of the body $3\frac{1}{2}$ lines ; of the wings 12 lines.

"a, b. Georgia. From Mr. Abbot's collection."

To this we add :

Head and *thorax* yellowish brown ; *antennae* (one is lost) yellow, darker toward the tip, with narrow dark annulations ; *legs* yellow, the fore tibiae tipped with darker ; *abdomen* blackish, paler at the posterior margins of the segments ; *fore wings* transparent, yellowish, with numerous brown spots between the veins forming irregular transverse bands across the wings, the apical margin wholly brown ; both the yellowish background and the brown spots are distinctly shown at the base of the wings and along the anterior and the posterior margins, leaving the apex and the area extending to the base of the median cell almost clear ; *hind wings* hyaline.

The length of the fore wing, 14 mm.

We designate as the type the female specimen from Georgia bearing the type label. There is a female paratype, evidently the one described by Ulmer (1906) ; Dr. Ulmer indicates that only the head, pro- and meso-thorax, one fore wing, the fore legs and one middle leg remain of this specimen, and there is no locality label.

POLYCENTROPIDAE.

Neureclipsis crepuscularis (Walker).

(Fig. 12.)

Phryganea crepuscularis Barnston (MSS.).

1852. *Brachycentrus crepuscularis* Walker, Cat. Neur. Brit. Mus. : 87.

1861. *Polycentropus crepuscularis* Hagen, Syn. Neur. N. Amer. : 292.

1863. *Polycentropus crepuscularis* McLachlan, Ent. Ann. : 163.

1864. *Polycentropus crepuscularis* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 873.

1878. *Neureclipsis crepuscularis* McLachlan, Rev. and Syn. Trich. : 393 (suggests that *Hydropsyche dubitans* Walker is probably the male).

1892. *Polycentropus crepuscularis* Banks, Trans. Amer. Ent. Soc., 19 : 367.

1907. *Neureclipsis crepuscularis* Ulmer, Genera Insect., fasc. 60a : 181.

1907. *Neureclipsis crepuscularis* Banks, Cat. Neur. Ins. U.S. : 49.

1936. *Neureclipsis crepuscularis* Milne, St. N. Amer. Trich., 3 : 88.

Walker describes the species as follows :

"*Niger, luteo-hirtus ; antennis, abdominis segmentis apice, pedibusque testaceis ; alae cinereae, anticae testaceo-pubescentes.*

"Black, clothed with luteous hairs : antennae testaceous, with an indistinct ring of a darker colour on each joint, black towards the tips : abdomen testaceous

along the hind border of each segment and at the tip : legs testaceous : wings gray ; fore-wings thickly covered with testaceous down ; veins tawny. Length of the body $2\frac{1}{2}$ lines ; of the wings 8 lines.

"a. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

To this we add :

Antennae yellow at base, with broad, dark annulations ; *head* mostly

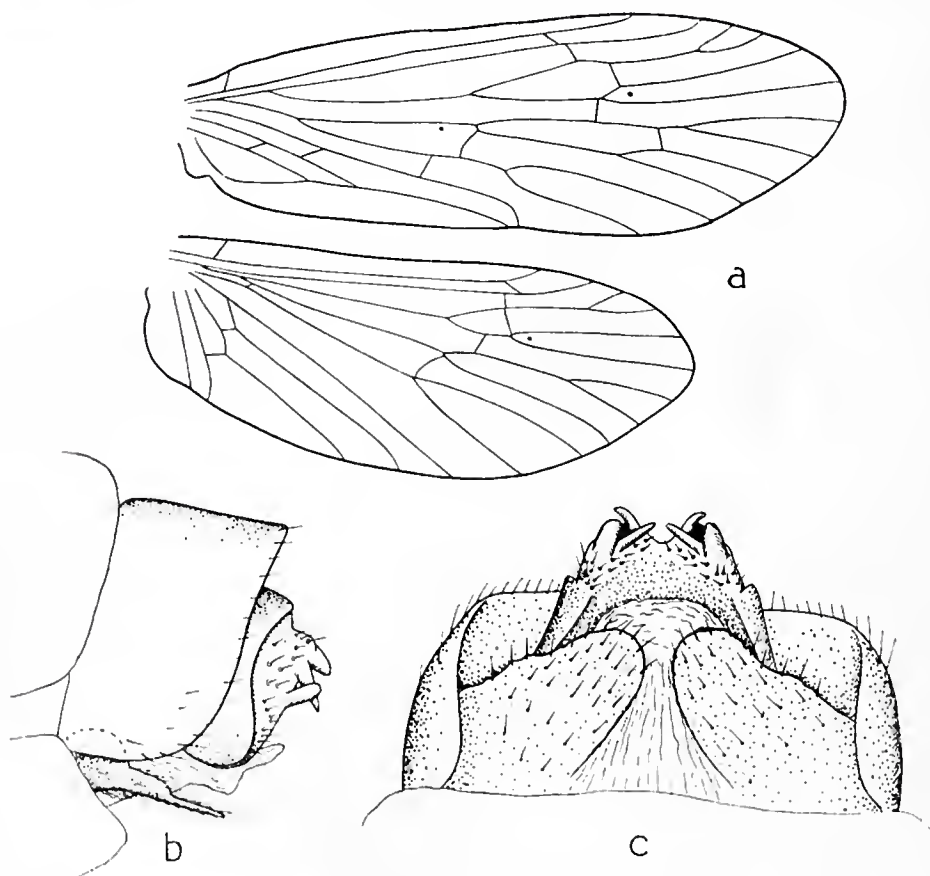


FIG. 12.—*Neureclipsis crepuscularis* Walk. ♀ : a, wings ; b, genitalia, lateral, c, ventral.

covered with whitish hair ; *thorax* black, with bunches of yellow hair on the pronotum and mesonotum and on the tegulae ; *legs*, including the spurs, yellow ; *wings* yellow, with short yellow hair, a fringe of pale hair at the apex.

Length of the fore wing, female, 9 mm.

Genitalia, female.—From above, the terminal segment is very small and almost completely withdrawn into the preceding segment ; it is furnished with three pairs of very small, finger-like processes, the upper fingers diverging and directed downwards, the lower directed distally ; the apices of the middle pair are acute, of the outer pairs blunt ; from beneath, the 3rd pair may be seen directed inwardly and distally ; below is a wide membranous plate with rounded apex bordering the tubular piece ; arising at its base are two large

plates with rounded apices inclining towards each other and about as long as the central plate ; lateral filaments moderately long.

There is a single female type-specimen, the antennae largely lacking. We include a figure of the venation.

Hydropsyche dubitans Walker, identified by McLachlan as probably the male of this species, belongs instead with *Neureclipsis valida* Walker.

To identify *Neureclipsis parvula* Banks with this species, as Milne has done, seems at least premature. The type of *crepuscularis* does not show the reddish tinge in the pubescence of the fore wings that is evident in the specimens of *parvula* now available to us. It may be that a study of the female genitalia will later resolve the problem.

Neureclipsis parvula Banks.

(Fig. 13.)

1852. *Polycentropus crassicornis* var. β Walker, Cat. Neur. Brit. Mus. : 101.
 1861. *Polycentropus crassicornis* var. Hagen, Syn. Neur. N. Amer. : 292.
 1863. *Polycentropus crassicornis* var. McLachlan, Ent. Ann. : 160, 163 (indicates that the variety is a distinct species).
 1907. *Neureclipsis parvula* Banks, Journ. N.Y. Ent. Soc., 15 : 163, figs. 2, 3.
 1907. *Neureclipsis parvula* Banks, Cat. Neur. Ins., U.S. : 49.
 1933. *Neureclipsis parvula* Carpenter, Psyche, 40 : 44.
 1934. *Neureclipsis parvula* Betten, N.Y. State Mus. Bull., 292 : 210, pl. 22, fig. 8, pl. 23, fig. 1.
 1936. *Neureclipsis parvulus* Milne, St. N. Amer. Trich., 3 : 88 (listed as synonym of *N. crepuscularis* Walker).
 1938. *Neureclipsis parvulus* Ross, Psyche, 45 : 12 (type-specimen *parvula* designated).

Walker describes the species as follows :

"*Ferrugineus, flavo-hirtus, subtus testaceus ; antennae fulvae, robustae ; palpi pedesque testacei ; alae subcinereae, anticae flavo-pubescentes et irroratae.*

"Ferruginous, thickly clothed with yellow hairs, testaceous beneath : antennae tawny, robust : palpi and legs testaceous : wings pale gray ; fore-wings clothed with yellow down, adorned with numerous pale yellow dots. Length of the body $1\frac{3}{4}$ – $2\frac{1}{4}$ lines ; of the wings 6–8 lines.

"Var. β .—Fore wings without dots.

"*a-e.* Georgia. From Mr. Abbot's collection."

Additional description and notes :

Head and *thorax* black, with bunches of tawny hair ; *antennae* with broad, dark annulations ; *legs* pale yellow ; *fore wings* light brown, uniformly covered with yellowish hair which appears brownish or reddish in some lights ; *abdomen* black, the genital appendages paler.

Length of the fore wing, 8 mm.

Genitalia, male.—The 9th tergite produced at its centre in a large dorsal plate, of which the lateral margins are elevated towards the apex so that a deep furrow is formed ; apical margin truncate or slightly excised at its middle ; intermediate appendages rather broad, margins serrate and fringed ; lower inner

margins as seen from beneath considerably produced at the base, and fringed with stout bristles; penis stout with a slightly constricted stem which expands to form a sort of collar before the apex; from the side there is seen a lower part of the apex which is rounded and separated from the acute upper part by

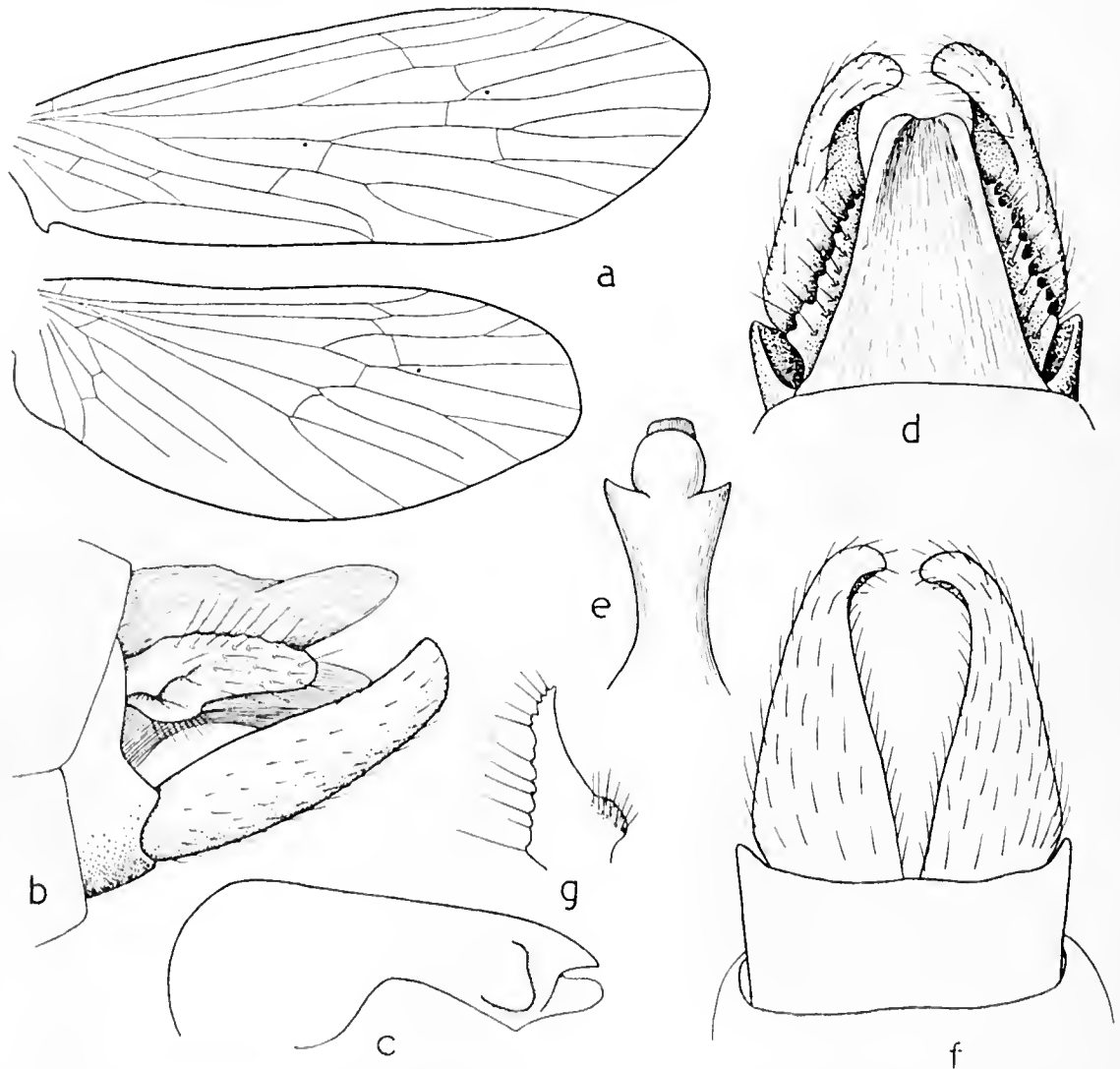


FIG. 13.—*Neureclipsis parvula* Banks. ♂: *a*, wings; *b*, genitalia, lateral; *c*, penis, lateral; *d*, genitalia, dorsal; *e*, penis, dorsal; *f*, genitalia, ventral; *g*, intermediate appendage, from beneath.

a narrow excision; inferior appendages large, tapering gradually to blunt, incurved apices which extend beyond the apex of the dorsal plate.

Walker included this specimen, designated as variety β , lacking dots in the fore wing, among his type series of *Polycentropus crassicornis*. We do not follow Milne in identifying it with the female type of *Neureclipsis crepuscularis*, partly because of the wide separation in latitude (Hudson's Bay and Georgia), partly because of a rather large difference in size, but

mostly because the pubescence of the fore wing shows a reddish tinge not seen in the type of *crepuscularis*. In this respect it agrees with female specimens of *N. parvula* presented to the British Museum by Mr. Nathan Banks, and we are convinced that it belongs to this latter species. It agrees also with the specimens determined and figured by Betten (1934) as *N. parvula*.

Neureclipsis valida (Walker).

(Figs. 14, 15.)

- 1852. *Polycentropus validus* Walker, Cat. Neur. Brit. Mus. : 100.
- 1852. *Hydropsyche dubitans* Walker, Cat. Neur. Brit. Mus. : 113.
- 1861. *Hydropsyche dubitans* Hagen, Syn. Neur. N. Amer. : 289.
- 1861. *Polycentropus validus* Hagen, Syn. Neur. N. Amer. : 292.
- 1863. *Hydropsyche dubitans* McLaehlan, Ent. Ann. : 163.
- 1863. *Polycentropus validus* McLaehlan, Ent. Ann. : 163.
- 1864. *Hydropsyche dubitans* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 822.
- 1864. *Polycentropus validus* Hagen, Verh. Zool. Bot. Ges. Wien. 14 : 875.
- 1878. *Neureclipsis dubitans* McLaehlan, Rev. and Syn. Trich. : 393 (*dubitans* identified with *crepuscularis* in error).
- 1892. *Hydropsyche dubitans* Banks, Trans. Amer. Ent. Soc., 19 : 367.
- 1897. *Polycentropus signatus* Banks, Trans. Amer. Ent. Soc., 24 : 30.
- 1907. *Neureclipsis crepuscularis* Ulmer, *partim*, Genera Insect., fase. 60a : 181 (by inclusion of *dubitans* as synonym following McLaehlan).
- 1907. *Polycentropus signatus* Ulmer, *partim*, Genera Insect., fase. 60a : 184 (by inclusion of *dubitans* as synonym following McLaehlan).
- 1907. *Polycentropus validus* Ulmer, Genera Insect., fase. 60a : 184.
- 1907. *Polycentropus signatus* Banks, Cat. Neur. Ins. U.S. : 48.
- 1907. *Polycentropus validus* Banks, Cat. Neur. Ins. U.S. : 48.
- 1907. *Neureclipsis crepuscularis* Banks, *partim*, Cat. Neur. Ins. U.S. : 49 (by inclusion of *dubitans* as synonym following McLaehlan).
- 1914. *Polycentropus signatus* Banks, Can. Ent., 46 : 257, pl. 20, fig. 72.
- 1934. *Neureclipsis crepuscularis* Betten, *nec* Walker, N.Y. State Mus. Bull., 292 : 210, pl. 22, figs. 9-13 (*signatus* reduced to synonymy).
- 1934. *Polycentropus validus* Betten, N.Y. State Mus. Bull., 292 : 221.
- 1936. *Neureclipsis validus* Milne, St. N. Amer. Trich., 3 : 84, 88.

Walker describes *Polycentropus validus* as follows :

"*Nigricans, flavo-hirtus, subtus ferrugineus; palpi testacei, basi nigri; antennae fulvae, robustae; pedes testacei; alae cinerae, flavo-pubescentes.*

"Blackish, clothed with pale yellow hairs, ferruginous beneath : maxillary palpi testaceous : 1st joint black : antennae tawny, stout : legs testaceous : wings gray, clothed with yellow down. Length of the body $2\frac{1}{2}$ lines ; of the wings 7 lines.

"*a.* United States. Presented by E. Doubleday, Esq."

And *Hydropsyche dubitans* :

"*Picea; antennae testaceae apice nigrae; pectus ferrugineum; pedes testacei; alae cinerae, antecae fusco-hirtae, maculis nonnullis e pilis flavis congestis pallidioribus.*

"Pitchy, clothed with pale hairs : antennae testaceous, black towards the tips : palpi, legs and hind borders of the abdominal segments testaceous : breast ferruginous : wings gray ; fore-wings clothed with brown hairs, having some indistinct spots composed of pale yellow hairs. Length of the body 3 lines ; of the wings 11 lines.

"*a.* United States. Presented by E. Doubleday, Esq."

To this we add :

Head black, covered with pale yellowish hairs ; *antennae* with broad brown

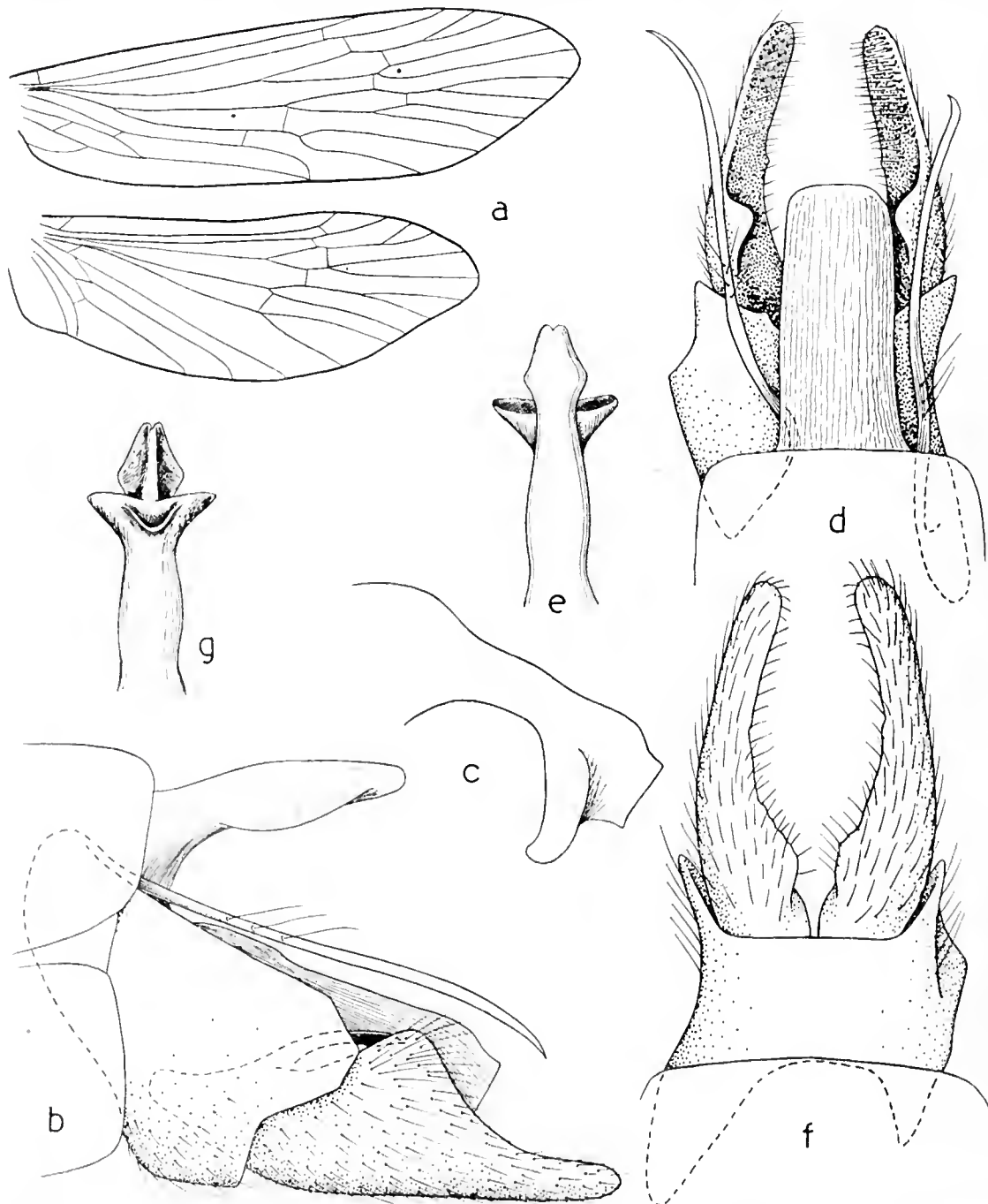


FIG. 14.—*Neureclipsis valida* Walk. ♂ : *a*, wings ; *b*, genitalia, lateral ; *c*, penis, lateral ; *d*, genitalia, dorsal ; *e*, penis, dorsal ; *f*, genitalia, ventral ; *g*, penis, ventral.

and narrow pale annulations, the latter disappearing towards the tip ; palpi light brown ; *thorax* black, the pronotum and the middle of the mesonotum with yellow hairs ; *fore wings* brown, with short black hairs and with some

tawny hairs, the latter most conspicuous on the anal veins, but showing also elsewhere on the wings; the pale spots referred to in the description of *dubitans* are indistinct, one at the cross-vein m-cu showing most clearly, others at the cross-vein of the sector and at the cross-vein r-m.

Length of the fore wing, male, 8 mm.

Genitalia, male.—Apical margin of the 9th tergite produced in a semi-membranous dorsal plate; intermediate appendages in the form of a pair of long, slender spines; penis with a produced lower apical part and excised apex; from above is seen a pair of small angular dilations before the apex; the lower apical part appears below these dilations as a pair of lateral wings of which the apical margin is concave from above, straight from beneath; from the side the lower part is directed downwards to make a shallow trough;

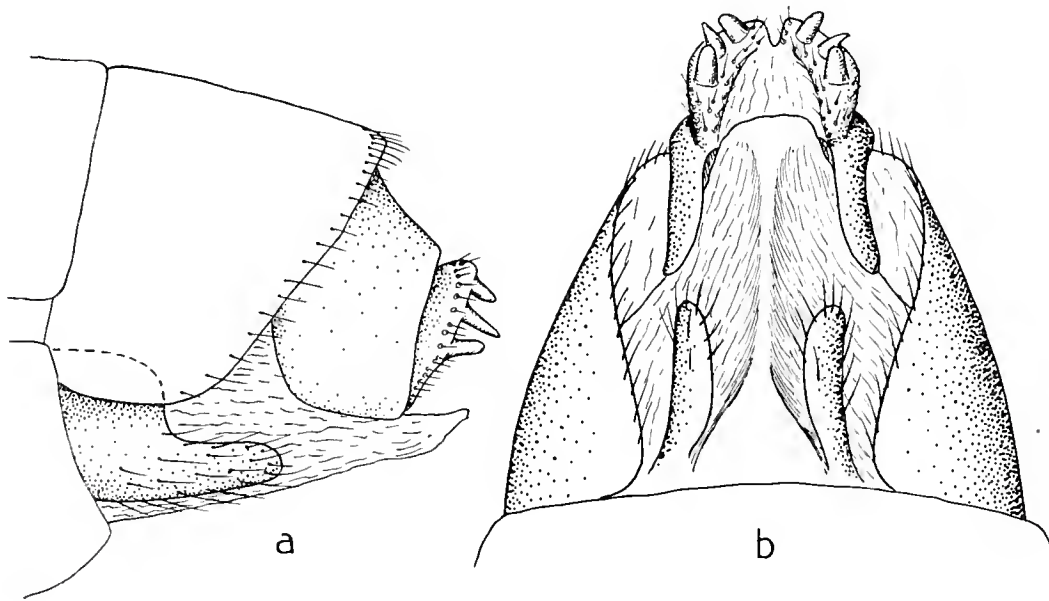


FIG. 15.—*Neureclipsis valida* Walk. ♀: *a*, genitalia, lateral, *b*, ventral.

inferior appendages broad, with a large triangular projection of the upper margin towards the base, seen from the side, apex of this projection somewhat turned over; the appendage is then produced in a finger and there is a small, projection of the lower inner margin near the base, more pronounced on one side in the type; each appendage bears a short superior, arching branch, only visible in a cleared example; from beneath, the apical margin of the 9th sternite is widely and squarely excised.

Genitalia, female.—From above, the terminal segment is very small, partly withdrawn into the preceding one; beyond it is a pair of plates each bearing three small finger-like processes, only two of which are visible from above; the apices of the middle fingers are acute, of the outer, blunt; from beneath there is a large plate with rounded apical margin bordering the tubular piece; at the base of this, one on each side, is a finger-like plate reaching to about half the way up the central plate; lateral filaments moderately long.

There is some asymmetry in the male type in relation to the 9th segment, so that one of the intermediate appendages appears to be based further back than the other.

The type specimen of *Polycentropus validus* Walker, a male, lacks parts of the antennae, a fore leg and a middle leg. Fortunately, while the wings are damaged, enough remains to establish the fact that the female type of *Hydropsyche dubitans* Walker is also *Polycentropus validus* Walker. This judgment is confirmed by a comparison of these types with males and females collected together at Buffalo, N.Y., in 1905 by Betten.

The female type of *Neureclipsis crepuscularis*, with which McLachlan identified the female type *dubitans*—in our opinion, incorrectly—while showing close similarity in size, in shape of the wings, and in the venation, seems very distinct in colour, as reference to its description will show.

Phylocentropus placidus (Banks).

(Fig. 16.)

- 1852. *Polycentropus crassicornis* Walker, *partim*, Cat. Neur. Brit. Mus. : 101.
- 1861. *Polycentropus crassicornis* Hagen, *partim*, Syn. Neur. N. Amer. : 292.
- 1863. *Polycentropus crassicornis* McLachlan, *partim*, Ent. Ann. : 160, 163.
- 1905. *Holocentropus placidus* Banks, Trans. Amer. Ent. Soc., 32 : 15.
- 1907. *Phylocentropus placidus* Banks, Proe. Ent. Soc. Wash., 9 : 131.
- 1907. *Phylocentropus placidus* Ulmer, Genera Insect., fasc. 60a : 182, pl. 24, fig. 223.
- 1907. *Phylocentropus placidus* Banks, Cat. Neur. Ins. U.S. : 48.
- 1926. *Phylocentropus placidus* Sibley, Bull. Lloyd Libr., no. 27, Ent. Ser., 5 : 103.
- 1934. *Phylocentropus placidus* Betten, N.Y. State Mus. Bull., 292 : 212, pl. 23, figs. 2-8.
- 1936. *Phylocentropus placidus* Milne, St. N. Amer. Trich., 3 : 84, 88.
- 1938. *Phylocentropus placidus* Ross, Psyche, 45 : 13 (type-specimen designated).

Walker describes the species as follows :

"*Ferrugineus, flavo-hirtus, subtus testaceus ; antennae fulvae, robustae ; palpi pedesque testacei ; alae subcinereae, anticae flavo-pubescentes et irroratae.*

"Ferruginous, thickly clothed with yellow hairs, testaceous beneath : antennae tawny, robust : palpi and legs testaceous : wings pale gray ; fore-wings clothed with yellow down, adorned with numerous pale yellow dots. Length of the body $1\frac{3}{4}$ - $2\frac{1}{4}$ lined ; of the wings 6-8 lines.

"*a-e.* Georgia. From Mr. Abbot's collection."

We add :

Head black above with yellow hair which is densest on the posterior warts ; these latter are very large, placed obliquely with reference to the median line ; face yellowish brown with scant yellow pubescence ; *antennae* stout, the basal joint brown, about one-half the length of the head, the succeeding joints yellow with dark brown rings ; *palpi* yellow ; *thorax* above, dark brown ; pronotum with two warts covered with yellow bristles ; mesonotum anteriorly with two rounded areas covered with yellow bristles and with similar posterior areas nearer the median line ; *thorax* beneath, *legs* and spurs yellow ; *fore wings* light brown, with numerous white dots which show plainest along the wing

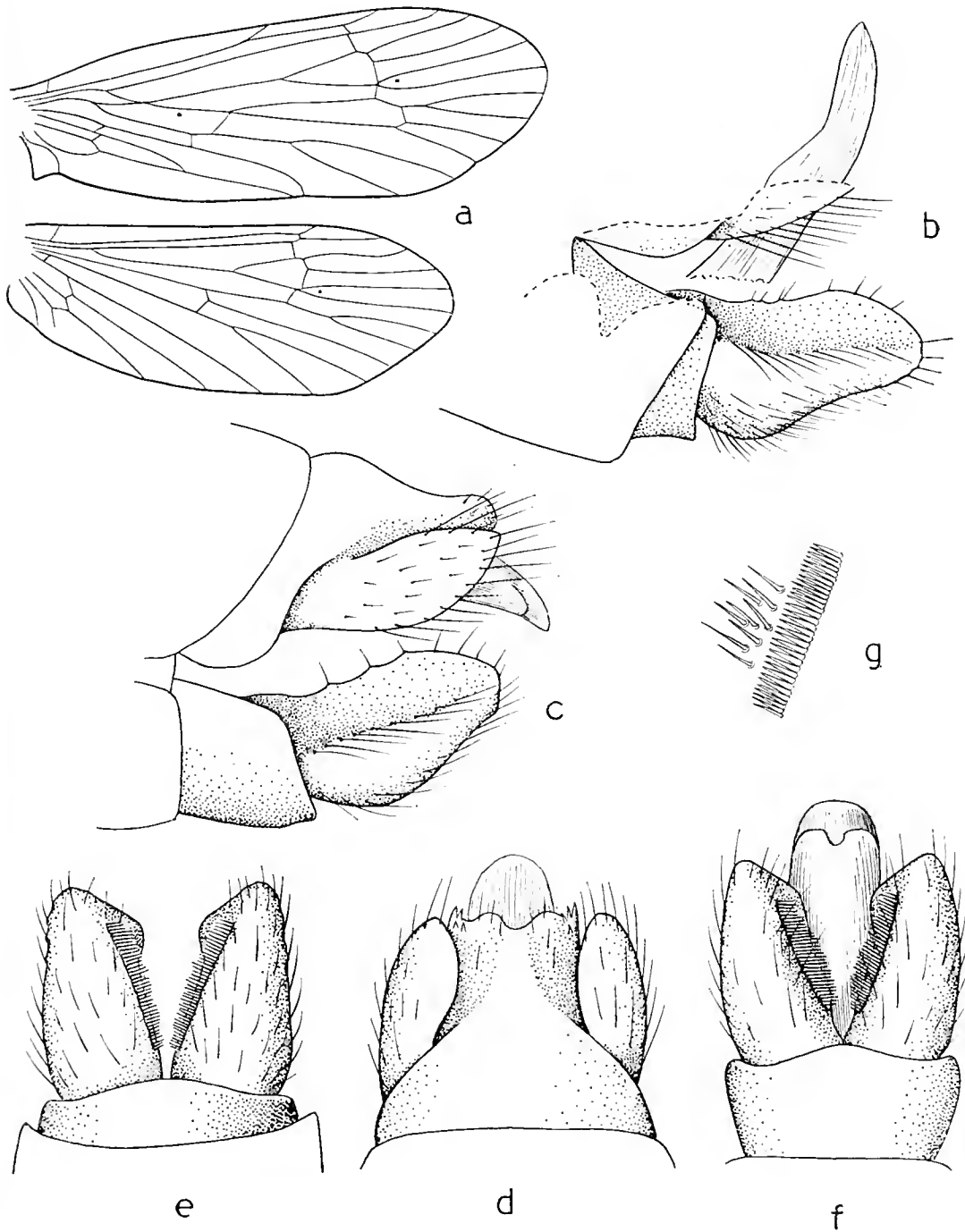


FIG. 16.—*Phylocentropus placidus* Walk. ♂: *a*, wings; *b*, genitalia, lateral (type), *c*, the same from an example from the Betten collection, *d*, dorsal (Betten specimen); *e*, inferior appendages, ventral (type); *f*, genitalia, ventral (Betten specimen); *g*, teeth on the inner surface of the inferior appendage.

margin ; in the fore wing the radial sector is arched against the media near the base of the wing ; *hind wing* tinged faintly brownish, the apex a little darker.

Length of the fore wing, 8.5 mm.

Genitalia, male.—The genitalia of the type are almost completely devoured by pests. Figures of the remaining parts are given together with figures from an example in the Betten collection. This composite description has been made from both examples.

The 9th tergite is produced in a large dorsal plate whose apical margin is roundly excised at the centre and bears a few minute, transparent teeth at the apical angles ; on each side of this plate is an elongated, oval, superior appendage ; upper penis-cover membranous and somewhat finger-shaped, apex projecting beyond the dorsal plate, seen from above ; penis with its apex excised ; in the type, the penis may possibly have been inverted ; inferior appendages very thick ; on a ridge towards the centre is a longitudinal, palisade-like row of short, black teeth beyond which is a mass of more widely scattered and rather longer teeth ; apical margin of the 9th sternite produced and rounded at its centre.

The specimen is one of the type series included by Walker in his description of *Polycentropus crassicornis* (below). It is not in condition for description, but the parts remaining leave no doubt as to its identity.

Plectrocnemia crassicornis (Walker).

(Fig. 17.)

- 1852. *Polycentropus crassicornis* Walker, *partim*, Cat. Neur. Brit. Mus. : 101.
- 1861. *Polycentropus crassicornis* Hagen, Syn. Neur. N. Amer. : 292.
- 1861. *Polycentropus confusus* Hagen, *partim*, Syn. Neur. N. Amer. : 293.
- 1863. *Polycentropus crassicornis* McLachlan, Ent. Ann. : 160, 163.
- 1864. *Polycentropus crassicornis* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 873.
- 1864. *Polycentropus confusus* Hagen, *partim*, Verh. Zool. Bot. Ges. Wien, 14 : 873.
- 1892. *Polycentropus crassicornis* Banks, Trans. Amer. Ent. Soc., 19 : 367.
- 1906. *Plectrocnemia crassicornis* Ulmer, Notes Leyd. Mus., 28 : 83, fig. 84.
- 1907. *Plectrocnemia crassicornis* Ulmer, Genera Insect., fasc. 60a : 183.
- 1907. *Plectrocnemia crassicornis* Banks, Cat. Neur. Ins. U.S. : 47.
- 1914. *Plectrocnemia adironica* Banks, Can. Ent., 46 : 256, pl. 20, fig. 60.
- 1934. *Plectrocnemia adironica* Betten, N.Y. State Mus. Bull., 292 : 215.
- 1934. *Plectrocnemia confusa* Betten, N.Y. State Mus. Bull., 292 : 218.
- 1934. *Plectrocnemia crassicornis* Betten, N.Y. State Mus. Bull., 292 : 218.
- 1936. *Neureclipsis crassicornis* Milne, St. N. Amer. Trich., 3 : 88 (listed as synonym of *crepuscularis* Walker).

Walker describes the species as follows :

"*Ferrugineus, flavo-hirtus, subtus testaceus ; antennae fulvae, robustae ; palpi pedesque testacei ; alae subcinereae, anticae flavo-pubescentes et irroratae.*

"Ferruginous, thickly clothed with yellow hairs, testaceous beneath : antennae tawny, robust : palpi and legs testaceous : wings pale gray ; fore-wings clothed with yellow down, adorned with numerous pale yellow dots. Length of the body 1 $\frac{3}{4}$ –2 $\frac{1}{4}$ lines ; of the wings 6–8 lines.

"*a-e.* Georgia. From Mr. Abbot's collection."

We add :

Head and *thorax* dark brown, with pale and with black hair ; antennal

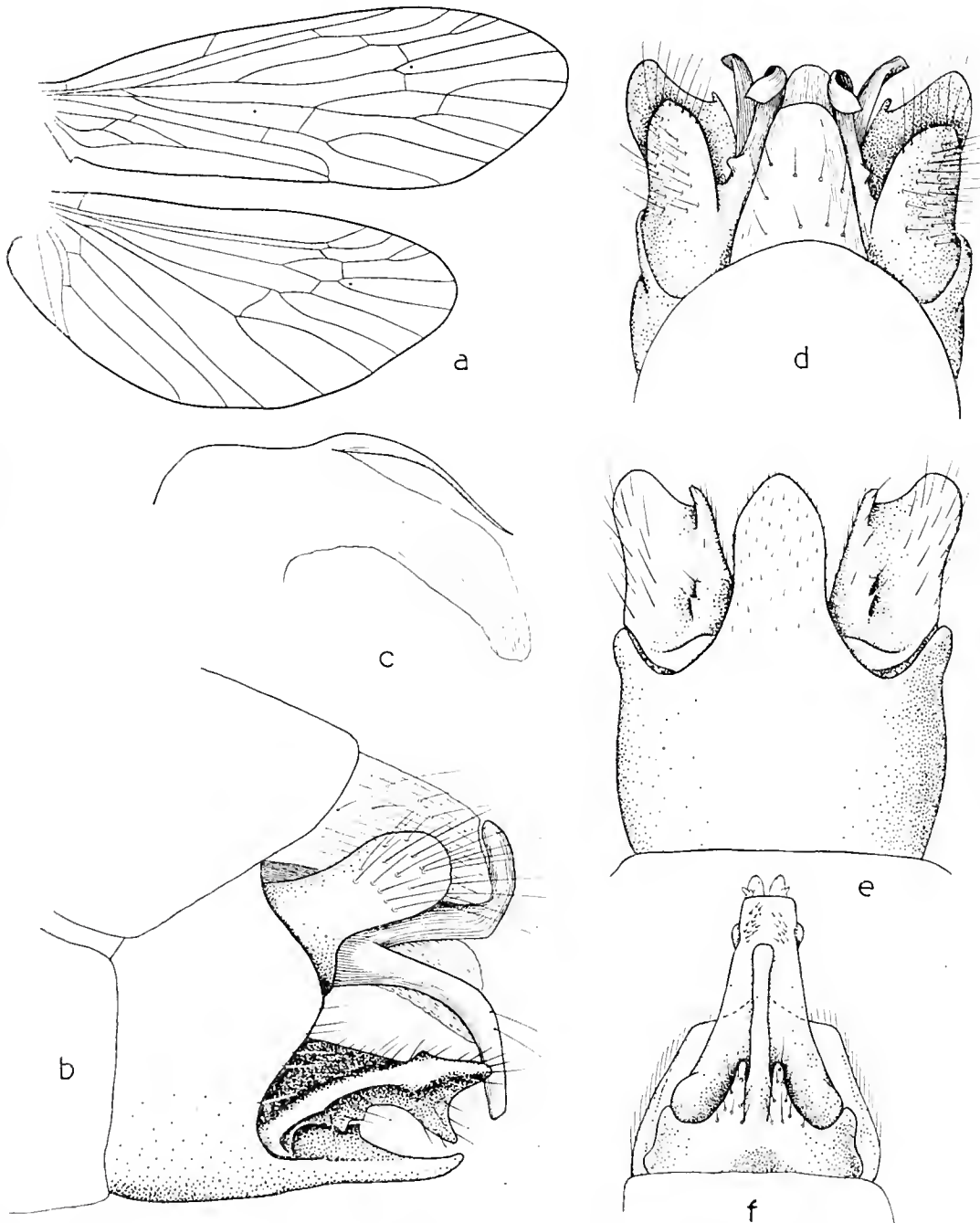


FIG. 17.—*Plectrocnemia crassicornis* Walk. : *a*, wings ♂ ; *b*, genitalia ♂, lateral ; *c*, penis and upper penis-cover, lateral ; *d*, genitalia, dorsal, *e*, ventral ; *f*, genitalia ♀, ventral.

joints dark at base and pale at apex ; *legs* yellowish brown ; what remains of the hind leg is somewhat lighter than the others, its spurs reddish brown ; *fore wings* with brown and whitish hair giving a spotted appearance, more

clearly so along the margins, the middle of the wings being clear; *hind wings* transparent, with short brown pubescence, the area between the tips of Sc and R₁ a little darker.

Length of the fore wing, male, 10 mm.; female, 9 mm.

Genitalia, male.—Apical margin of the 9th tergite produced in a semi-membranous plate; beneath this is a complicated structure consisting of broadened outer plates and inner bifurcate processes of which the upper forks terminate in back-turned, broadened plates which extend beyond and above the dorsal plate; the lower forks are very stout and arch downwards, one on each side of the penis, extending beyond it; penis short and membranous, arching downward, with a single dorsal spine or narrow plate; inferior appendages from the side, with a strong angular projection of the lower margin towards the apex, continuing as a short, serrate ridge towards the base; from above, they are broad with broadened apices of which the inner angles are produced; from beneath, the inner margins are strongly serrate at the base, but concealed; the centre of the apical margin of the 9th sternite produced in a long tongue; lateral filaments to the 5th segment.

Genitalia, female.—Terminal segment produced in a long, conical ovipositor; from beneath, the sternite anterior to this ovipositor is furnished at the centre of the apical margin with a long and very narrow plate, dilated at its apex; on each side is a short plate which is seen as an extension of the margin of the segment with a widely concave outer and a straight inner margin.

We have located all the five specimens of the series originally described by Walker as *Polycentropus crassicornis*, a male collected in Georgia being here designated as the type. It lacks the tips of the antennae, all of one leg, and the tarsi of the other legs. A female specimen also from Georgia agrees with the male in general appearance, but the spots on the fore wing are more clearly shown, and they occur in the middle of the wing as well as along the margins. This we consider to be the allotype. Another of the specimens is a male of the genus *Neureclipsis*, here identified as *N. parvula* Banks; it is doubtless the var. β of Walker's description. Probably it is this specimen which led Milne (*St. N. Amer. Trich.*, 3: 88) to place *crassicornis* as a synonym of *N. crepuscularis*. The fourth specimen is a male of *Phylocentropus placidus* Banks. The fifth specimen mentioned by Walker is now in the collection of Dr. Georg Ulmer; it is a female and has been used to complete the figure of the genitalia, since the abdomen of the allotype has been slightly damaged.

Mr. Nathan Banks writes that his *P. adironica* is identical with the *Plectrocnemia* portion of Hagen's series of *Polycentropus confusus*. We find that a specimen of *P. adironica* sent by Mr. Banks agrees with Walker's *crassicornis* and we therefore list both *adironica* and *confusus* (*partim*) as synonyms.

PSYCHOMYIDAE.

Tinodes parva (Walker).

Hydroptila parva Barnston (MSS.).

1852. *Hydroptila* ? *parva* Walker, Cat. Neur. Brit. Mus. : 134.
 1861. *Psychomyia parva* Hagen, Syn. Neur. N. Amer. : 294.
 1863. *Tinodes parva* McLachlan, Ent. Ann. : 163.
 1864. *Tinodes parva* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 888.
 1873. *Psychomyia parva* Eaton, Trans. Ent. Soc. Lond., 1873 : 129.
 1892. *Tinodes* ? *parva* Banks, Trans. Amer. Ent. Soc., 19 : 367.
 1907. *Psychomyia parva* Ulmer, Genera Insect., fasc. 60a : 194.
 1907. *Tinodes parva* Banks, Cat. Neur. Ins. U.S. : 49.
 1934. *Tinodes parva* Betten, N.Y. State Mus. Bull., 292 : 228.

Walker describes the species as follows :

“*Testacea ; abdominis dorsum piceum ; alae albidæ.*

“A mutilated specimen. Testaceous : abdomen pitchy above : wings whitish. Length of the body 1 line ; of the wings 3 lines.

“*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.”

We do not find this specimen in the Museum collection. McLachlan stated (1863) that it was “almost destroyed”.

CALAMOCERATIDAE.

Anisocentropus latifascia (Walker).

(Fig. 18.)

1852. *Notidobia latifascia* Walker, Cat. Neur. Brit. Mus. : 90.
 1852. *Goera elegans* Walker, Cat. Neur. Brit. Mus. : 95.
 1861. *Leptocerus elegans* Hagen, Syn. Neur. N. Amer. : 279.
 1861. *Leptocerus latifascia* Hagen, Syn. Neur. N. Amer. : 279.
 1863. *Leptocerus latifascia* McLachlan, Ent. Ann. : 159, 162 (*elegans* reduced to synonymy).
 1863. *Anisocentropus latifascia* McLachlan, Trans. Ent. Soc. Lond., (3) 1 : 495, pl. 19, fig. 5.
 1864. *Anisocentropus latifascia* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 804.
 1892. *Anisocentropus latifascia* Banks, Trans. Amer. Ent. Soc., 19 : 366.
 1906. *Anisocentropus latifascia* Ulmer, Notes Leyd. Mus., 28 : 54.
 1907. *Anisocentropus latifascia* Ulmer, Genera Insect., fasc. 60a : 118.
 1907. *Anisocentropus latifascia* Banks, Cat. Neur. Ins. U.S. : 44.
 1929. *Anisocentropus latifascia* Ulmer, Deutsch. Ent. Zeitschr., 1929 : 168.
 1934. *Anisocentropus latifascia* Betten, N.Y. State Mus. Bull., 292 : 232.
 1936. *Anisocentropus latifascia* Milne, St. N. Amer. Trich., 3 : 61.

Walker describes *Notidobia latifascia* as follows :

“*Testaceus, hirtus ; antennae articulis fusco cinctis ; alae anticae fascia lata obliqua fusca, posticae cinereae.*

“Testaceous, clothed with testaceous hairs : antennae slender, longer than the body, or perhaps twice its length ; each joint brown at the base ; 1st joint stout :

fore-wings with a broad oblique brown band beyond the middle ; hind-wings gray.
Length of the body $2\frac{1}{2}$ lines ; of the wings 9 lines.

"a. North America. Presented by the Entomological Club."

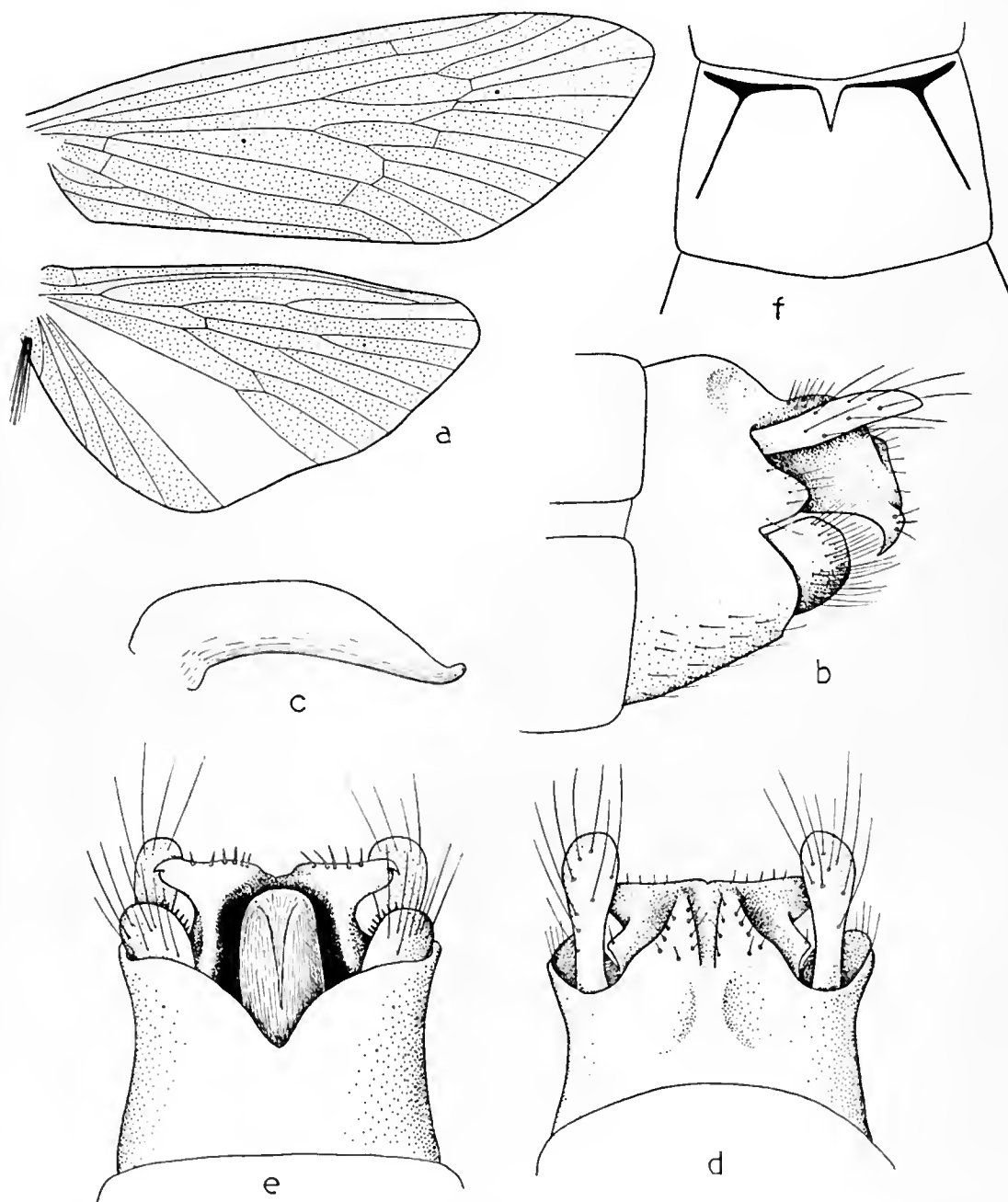


FIG. 18.—*Anisocentropus latifascia* Walk. ♂: a, wings; b, genitalia, lateral; c, penis, lateral (from the synonymous species *elegans*); d, genitalia, dorsal, e, ventral; f, pattern on the 4th tergite.

And *Goera elegans* :

"*Testacea, pilosa; antennae nigro annulatae, corpore triplo longiores; alae cinereae, anticae testaceo-pubescentes.*"

"Testaceous, clothed with testaceous hairs: antennae full thrice the length of the body, with a black ring on each joint: wings gray; fore-wings thickly clothed with testaceous down. Length of the body 3 lines; of the wings 11 lines.

"a. North America? Presented by the Entomological Club."

To this we add:

Head, basal joint of the antenna, palpi, thorax and legs all yellow, heavily clothed with yellow hair; *antennae* not complete, with broad brown and narrow yellow annulations, the yellow rings becoming narrower distally and almost disappearing at the broken ends; maxillary palpi distinctly six-jointed; the hind tibiae and tarsi have some rather long black hairs; the membrane of the *fore wing* is dark brown, almost completely covered with dense tawny hair; the broad oblique brown band of the original description shows very indistinctly in the specimen selected as the type; in the denuded wing, a very distinct pterostigma is shown and the brown band is faintly indicated; at the anal angle of the *hind wing* there is a heavy pencil of long hairs; the hind wing shows a striking character which may very likely be generic; the area immediately posterior to vein Cu_{1a} is clear, contrasting strongly with the brown on either side of it; the veins Cu_2 and 1st A that normally occupy this area are virtually obliterated.

The type *elegans* agrees with *latifascia* except that the apical half of the fore wing is darker than the base and is covered with dark brown hair; the oblique basal margin of this area is decidedly darker than the apex of the wing and forms the "oblique brown band" of the original description; the hind wings are brown with brown hairs.

Length of the fore wing, male, 11 mm.

Genitalia, male.—The 9th tergite is produced in a large plate with a truncate apex, excised slightly at its centre and with the apical angles produced in small, down-turned hooks; from above there are triangular projections midway along the lateral margins; towards the centre is a pair of ridges, wide at their bases and tapering to acute apices, separated by a deep furrow; at the centre of the anterior margin of each tergite is a narrow V-shaped clear space; superior appendages rather longer than the dorsal plate, apices dilated from above and bearing very long hairs; penis thick with a bifurcate inner structure enclosed in a membrane, tapering abruptly to a point, from the side; inferior appendages somewhat rounded from the side, inner surfaces covered with short teeth; 9th segment sharply excised about midway along its margin, seen from the side; deeply and widely excised from beneath.

The decided difference in general appearance between the types of *latifascia* and *elegans* is in the pubescence rather than in the membrane of the wings. A study of the genitalia leaves no doubt of the specific identity of these specimens. Nor is there doubt as to the generic position of the species; the six joints in the maxillary palpus which Ulmer (1929) has shown to be characteristic of *Anisocentropus* are clearly shown.

The type-specimen of *Anisocentropus latifascia* bears neither locality label

nor the label of the Entomological Club from which it was received. There is decided doubt that the species is found in North America. Walker indicated this in the description of *elegans*, but not in the case of *latifascia*. A third specimen in the British Museum, bearing the label "Nat. Mus. Victoria", agrees with the other two, and Ulmer records that he found specimens of the species in the Paris Museum, also collected in Australia. Since Australia is thus established as a habitat of the species, the North American record is very likely an error. Ulmer (1929) recorded the species as not from North America.

Anisocentropus pyraloides (Walker).

(Figs. 19, 20.)

- 1852. *Notidobia pyraloides* Walker, Cat. Neur. Brit. Mus. : 90.
- 1861. *Notidobia pyraloides* Hagen, Syn. Neur. N. Amer. : 271.
- 1863. *Notidobia pyraloides* McLachlan, Ent. Ann. : 158.
- 1863. *Anisocentropus pyraloides* McLachlan, Trans. Ent. Soc. Lond., (3) 1 : 495, pl. 19, fig. 3.
- 1864. *Anisocentropus pyraloides* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 804.
- 1892. *Anisocentropus pyraloides* Banks, Trans. Amer. Ent. Soc., 19 : 366.
- 1906. *Ganonema pyraloides* Ulmer, Notes Leyd. Mus., 28 : 48, figs. 58-60.
- 1907. *Ganonema pyraloides* Banks, Cat. Neur. Ins. U.S. : 44.
- 1907. *Ganonema pyraloides* Ulmer, Genera Insect., fasc. 60a : 116.
- 1915. *Ganonema pyraloides* Döhler, Deutsch. Ent. Zeitschr., 1915 : 405, figs. 12-14.
- 1929. *Anisocentropus pyraloides* Ulmer, Deutsch. Ent. Zeitschr., 1929 : 168.
- 1934. *Ganonema pyraloides* Betten, N.Y. State Mus. Bull., 292 : 235.
- 1936. *Ganonema pyraloides* Milne, St. N. Amer. Trich., 3 : 78, 125.

Walker describes the species as follows :

"*Fulvus, hirtus ; antennae testaceae, basi fuscae, corpore duplo longiores ; pedes testacei ; alae fuscae, anticae latae.*

"Tawny, clothed with tawny hairs : antennae testaceous, slender, about twice the length of the body, joints long, cylindrical, brown, with testaceous tips towards the base ; 1st joint stout, tawny ; legs testaceous : wings deep brown, thickly clothed and fringed with hairs ; fore-wings very broad ; veins brown. Length of the body $3\frac{1}{2}$ -4 lines ; of the wings 10-12 lines.

"*a, b. Georgia. From Mr. Abbot's collection.*"

To this we add :

Head, thorax and body yellowish brown, the head and body yellowish brown, the head and pronotum covered with yellow hairs ; palpi six-jointed, covered with yellow and with black hair ; *legs* yellow, with short yellow hair ; spurs 2, 4, 3 ; both pairs of wings dark brown, with blackish hairs and fringes ; *hind wings*, when denuded, with a clear area as described in *latifascia*.

The female allotype is like the male except that it is larger and that the wings do not appear so deep a brown. It agrees with the male in the number of the spurs and in the pale area of the hind wings.

Length of the fore wing, male, 11 mm. ; female, 13 mm.

Genitalia, male.—The 9th tergite produced in a large dorsal plate directed almost vertically downward with a very narrow, angular dorsal keel towards its base ; the tergite is also produced at the centre of its apical margin in a

small, blunt triangle ; seen from behind, the dorsal plate is very deeply excised at its apex ; the apical angles are not produced outwards as in *latifascia*, but are

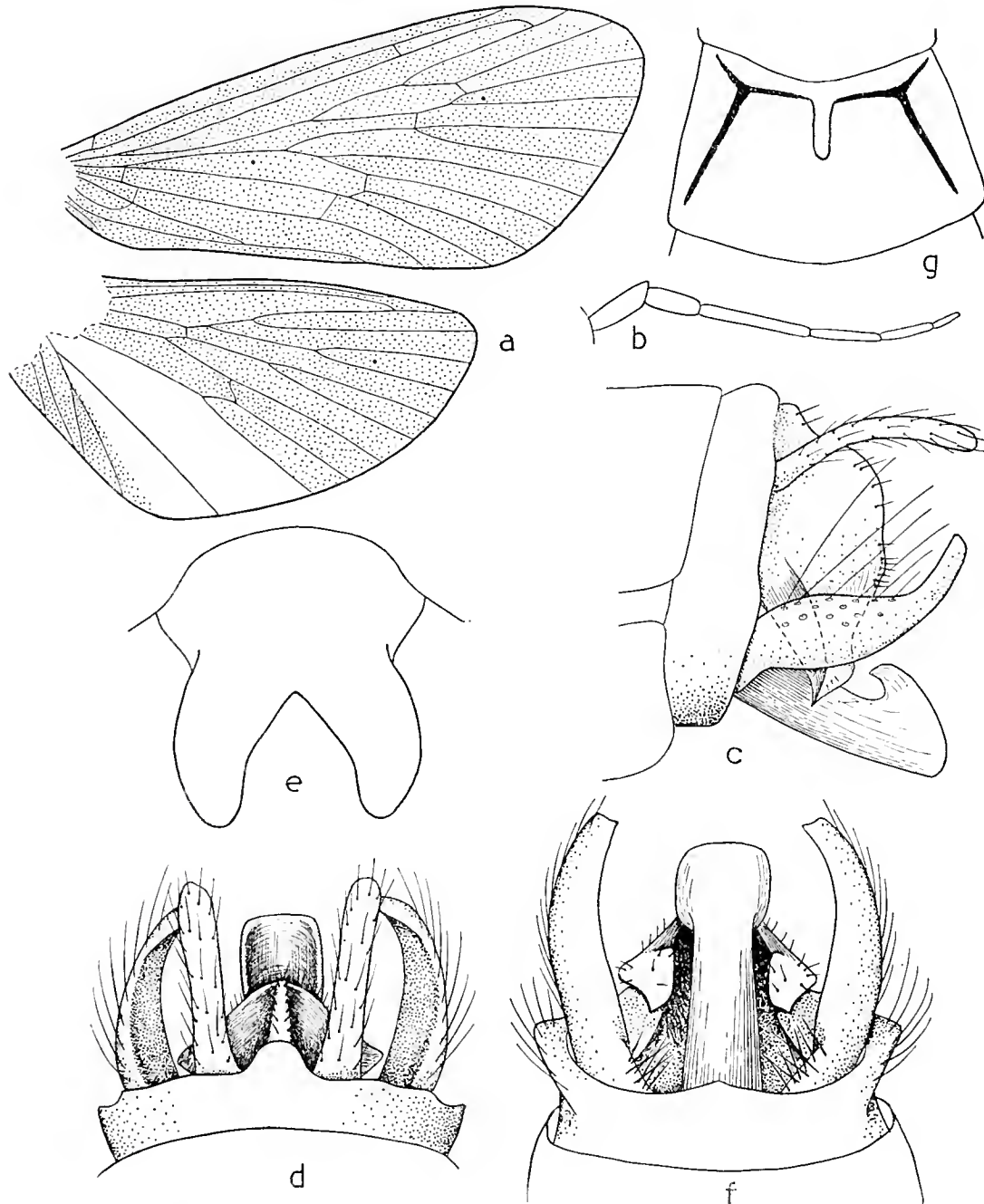


FIG. 19.—*Anisocentropus pyraloides* Walk. ♂: *a*, wings ; *b*, maxillary palpus ; *c*, genitalia, lateral, *d*, dorsal ; *e*, dorsal plate, from behind ; *f*, genitalia, ventral ; *g*, pattern on the 4th tergite.

directed downwards so that from the side they terminate in acutely pointed hooks, and are turned in to appear, from beneath, as somewhat broadened plates ; superior appendages rather long and slender, parallel and curving

slightly downward; penis thick, from the side, with a deep excision of the upper margin before its dilated apex which forms a broad, hooked trough; inferior appendage, from the side, dilated at the centre and terminating in a slender, upwardly and distally directed finger; from beneath, long and incurved, with a narrow, truncate apex.

Female.—The 9th tergite is produced at its centre in a small, wide triangle with an indication of a projection on each side; beyond this, distally, is a keel-like ridge with groups of stiff bristles on each side; the abdomen terminates in a pair of dorsal triangular plates, one of which is broken away in the allotype;

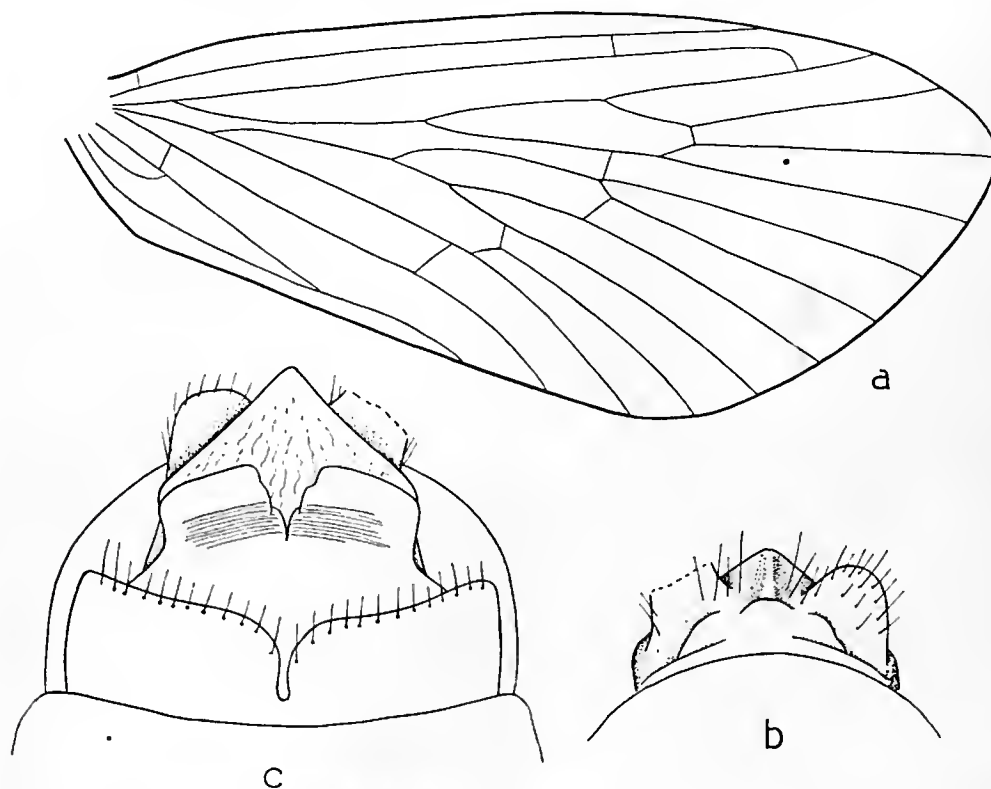


FIG. 20.—*Anisocentropus pyraloides* Walk. ♀: *a*, anterior wing; *b*, genitalia, dorsal, *c*, ventral.

from beneath, the 8th sternite is deeply excised; on the 9th are two somewhat rectangular plates, diverging from each other so as to leave a triangular excision between; the margin of the segment is produced in a large triangle with an acute apex.

Milne (1936) indicated that Hagen's specimen, determined as *pyraloides*, belongs to *Notidobia*. The only recorded locality for *pyraloides* is therefore Georgia.

Various authors have transferred this species backwards and forwards between *Anisocentropus* and *Ganonema*. The six-jointed maxillary palpi and the spurs clearly indicate its position in the former genus. The venation is, however, like that of *Ganonema* in that in both wings R_1 is arched down into

R₂ near the wing margin. In the male specimen the median cross-vein is wanting—perhaps an aberrancy.

We here designate the male specimen as the type.

Ganonema americanum (Walker).

(Fig. 21.)

- 1852. *Sericostoma americanum* Walker, Cat. Neur. Brit. Mus. : 85.
- 1861. *Sericostoma americanum* Hagen, Syn. Neur. N. Amer. : 270.
- 1863. *Sericostoma americanum* McLachlan, Ent. Ann. : 162.
- 1864. *Sericostoma americanum* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 880.
- 1876. *Sericostoma americanum* McLachlan, Rev. and Syn. Trich. : 225.
- 1877. *Sericostoma americanum* McLachlan, Rev. and Syn. Trich. : 345.
- 1892. *Sericostoma americana* Banks, Trans. Amer. Ent. Soc., 19 : 364.
- 1906. *Ganonema americanum* Ulmer, Notes Leyd. Mus., 28 : 47, fig. 57.
- 1907. *Ganonema americanum* Ulmer, Genera Insect., fasc. 60a : 116.
- 1907. *Ganonema americana* Banks, Cat. Neur. Ins. U.S. : 44.
- 1934. *Ganonema americanum* Betten, N.Y. State Mus. Bull., 292 : 234.
- 1936. *Ganomena americanum* Milne, St. N. Amer. Trich., 3 : 78, 79.

Walker describes the species as follows :

“*Nigrum, hirtum ; pedes picei ; alae nigro-fuscae, anticae plus triente posticis longiores.*”

“Black, clothed with black hairs : antennae about twice the length of the body ; joints long, cylindrical : legs pitchy : wings dark brown, hairy ; fore-wings almost fusiform, more than one-third longer than the hind wings. Length of the body 3 lines ; of the wings 16 lines.

“*a, b. Georgia. From Mr. Abbot's collection.*”

To this we add :

Head, thorax and abdomen brownish black ; antennae dark reddish brown, somewhat serrate internally ; palpi brown, the terminal segments somewhat paler ; *fore and hind wings* brown, the fore wing with anterior margin to the apex darker ; there are some ill-defined, slightly lighter areas not corresponding closely in the two fore wings of the type.

Length of the fore wing, female, 16 mm.

Genitalia, female.—From above, the apical margin of the terminal segment is produced and sharply excised with a pair of finger-like processes situated on the upper surface at the base of the excision ; from beneath, the 8th sternite is divided in two rectangular plates, of which the margins are fringed with short hairs ; the apical margin of the 9th sternite is strongly produced and excised with an almost square excision at its apex, continuing towards the base of the segment in a narrow cleft, on each side of which is a rounded, pigmented patch.

There are two female specimens from Georgia, of which the better preserved one, lacking only a middle leg, is here designated the type. The paratype lacks

the greater part of the antennae and the middle and hind legs; the wings are also somewhat damaged.

Milne (1936) reduced *G. nigrum* Lloyd to synonymy. It seems likely that this will be confirmed when males from the habitat of *americanum* become known.

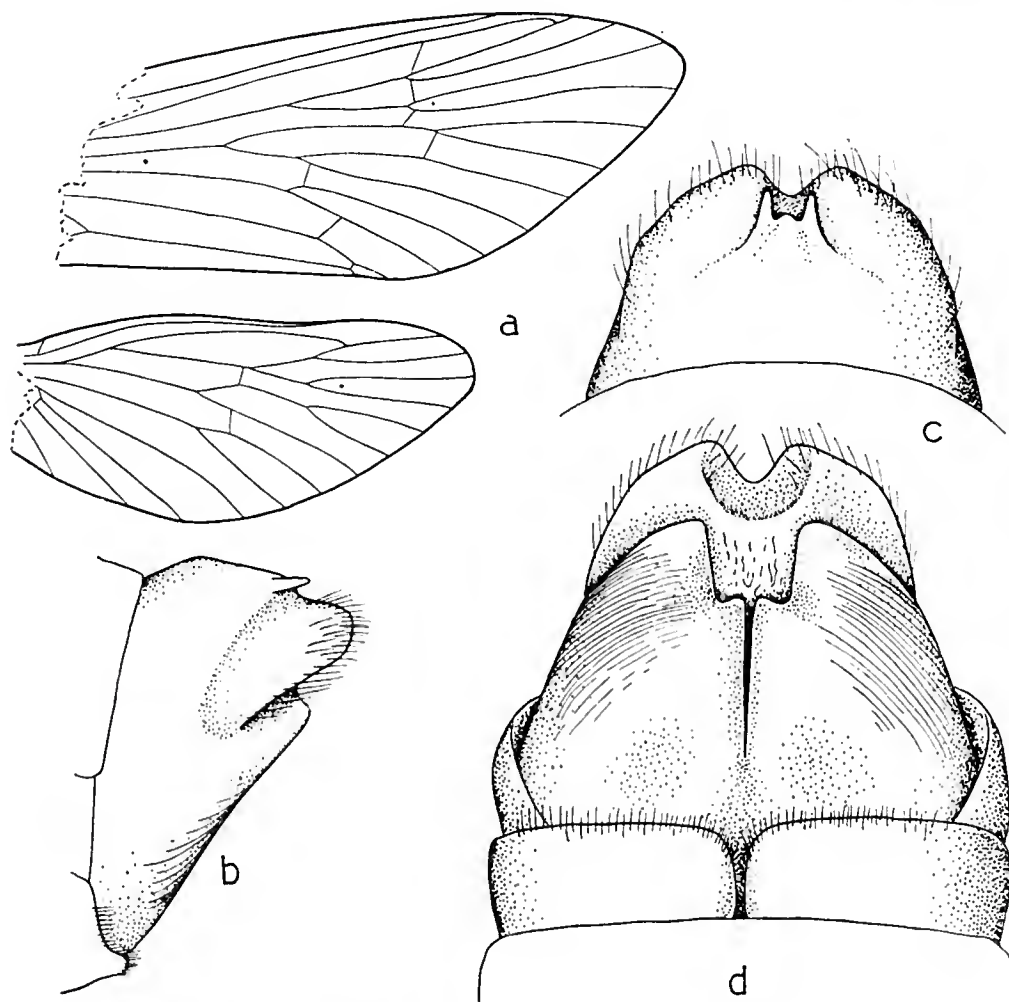


FIG. 21.—*Ganonema americanum* Walk. ♀: a, wings; b, genitalia, lateral, c, dorsal, d, ventral.

ODONTOCERIDAE.

Psilotreta indecisa (Walker).

(Fig. 22.)

- 1852. *Goera indecisa* Walker, Cat. Neur. Brit. Mus. : 95.
- 1861. *Molanna rufa* Hagen, Syn. Neur. N. Amer. : 276.
- 1861. *Leptocerus indecisa* Hagen, Syn. Neur. N. Amer. : 279.
- 1863. *Leptocerus indecisa* McLachlan, Ent. Ann. : 159.
- 1864. *Leptocerus indecisa* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 829.
- 1864. *Molanna rufa* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 847.

1877. *Heteroplectron borealis* Provancher, Le Nat. Can., 9 : 263.
 1878. *Heteroplectron borealis* Provancher, Petite Faun. Ent. Can., 2 : 139.
 1892. *Molanna rufa* Banks, Trans. Amer. Ent. Soc., 19 : 366.
 1892. *Leptocerus indecisus* Banks, Trans. Amer. Ent. Soc., 19 : 366.
 1892. *Heteroplectron borealis* Banks, Trans. Amer. Ent. Soc., 19 : 366.
 1897. *Heteroplectron ? dissimilis* Banks, Trans. Amer. Ent. Soc., 24 : 30.
 1899. *Psilotreta frontalis* Banks, Trans. Amer. Ent. Soc., 25 : 213.
 1905. *Heteroplectron boreale* Ulmer, Zeit. Wiss. Ins.-Biol., 1 : 30.
 1905. *Heteroplectron dissimile* Ulmer, Zeit. Wiss. Ins.-Biol., 1 : 30.
 1907. *Heteroplectron ? boreale* Ulmer, Genera Insect., fasc. 60a : 119.
 1907. *Heteroplectron dissimile* Ulmer, Genera Insect., fasc. 60a : 119.
 1907. *Psilotreta frontalis* Ulmer, Genera Insect., fasc. 60a : 126.
 1907. *Heteroplectron borealis* Banks, Cat. Neur. Ins. U.S. : 44.
 1907. *Heteroplectron dissimilis* Banks, Cat. Neur. Ins. U.S. : 44.
 1907. *Psilotreta frontalis* Banks, Cat. Neur. Ins. U.S. : 44.
 1914. *Astoplectron borealis* Banks, Can. Ent., 46 : 264.
 1914. *Astoplectron connexa* Banks, Can. Ent., 46 : 265, pl. 10, fig. 24, pl. 15, fig. 55.
 1934. *Heteroplectron boreale* Betten, N.Y. State Mus. Bull., 292 : 233.
 1934. *Psilotreta connexa* Betten, N.Y. State Mus. Bull., 292 : 240.
 1934. *Psilotreta dissimilis* Betten, N.Y. State Mus. Bull., 292 : 240.
 1934. *Psilotreta frontalis* Betten, N.Y. State Mus. Bull., 292 : 240, 241 (identity of *borealis*, *connexa*, *dissimilis*, *frontalis* suggested).
 1936. *Heteroplectron indecisum* Milne, St. N. Amer. Trich., 3 : 80 (*rufa*, *borealis*, *connexa*, *dissimilis*, *frontalis* reduced to synonymy).
 1938. *Heteroplectron dissimilis* Ross, Psyche, 45 : 19, 20 (type-specimen *dissimilis* designated ; species listed as *indecisa* Walker).
 1938. *Heteroplectron rufa* Ross, Psyche, 45 : 20 (type-specimen *rufa* designated ; species listed as *indecisa* Walker).

Walker describes the species as follows :

"*Nigra, pilosa ; antennae corpore plus duplo longiores ; pedes ferruginei ; alae nigricantes, anticae fusco-pubescentes.*

"Black, clothed with black hairs : palpi clothed with hoary hairs ; antennae more than twice the length of the body : legs dull ferruginous : wings blackish ; fore-wings clothed with dark brown down. Length of the body 3 lines ; of the wings 10 lines.

"*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

We add :

Head and *thorax* black, with dark brown hair, the thorax with some brown spots ; *antennae* (broken) covered with brown hair, the joints very indistinctly shown ; palpi brown, covered with long hairs which, while somewhat lighter in colour than the palpi themselves, are brown rather than "hoary" ; *legs* brown, lighter than the thorax, covered with short pale hairs ; spurs 2, 4, 4 ; *fore* and *hind wings* dark brown, with dark brown pubescence which obscures the venation ; *abdomen* black, with a lateral pale line ; genitalia brown, with long yellow hair.

Length of the fore wing, 11 mm.

Genitalia, male.—Apical margin of the 9th tergite produced in a long, narrow, oval process, on each side of which is a moderately long and strongly fringed superior appendage, dilated on its outer margin at the base ; upper

penis-cover very large, sloping slightly downward, apex bifurcate, the forks widely separated with a triangular production of the margin between their bases; the forks, from above, are long and slender, wide from the side; about midway the lateral margins of the cover are strongly excised, and just below these excisions arises a pair of outcurled hooks; apex of the penis membranous,

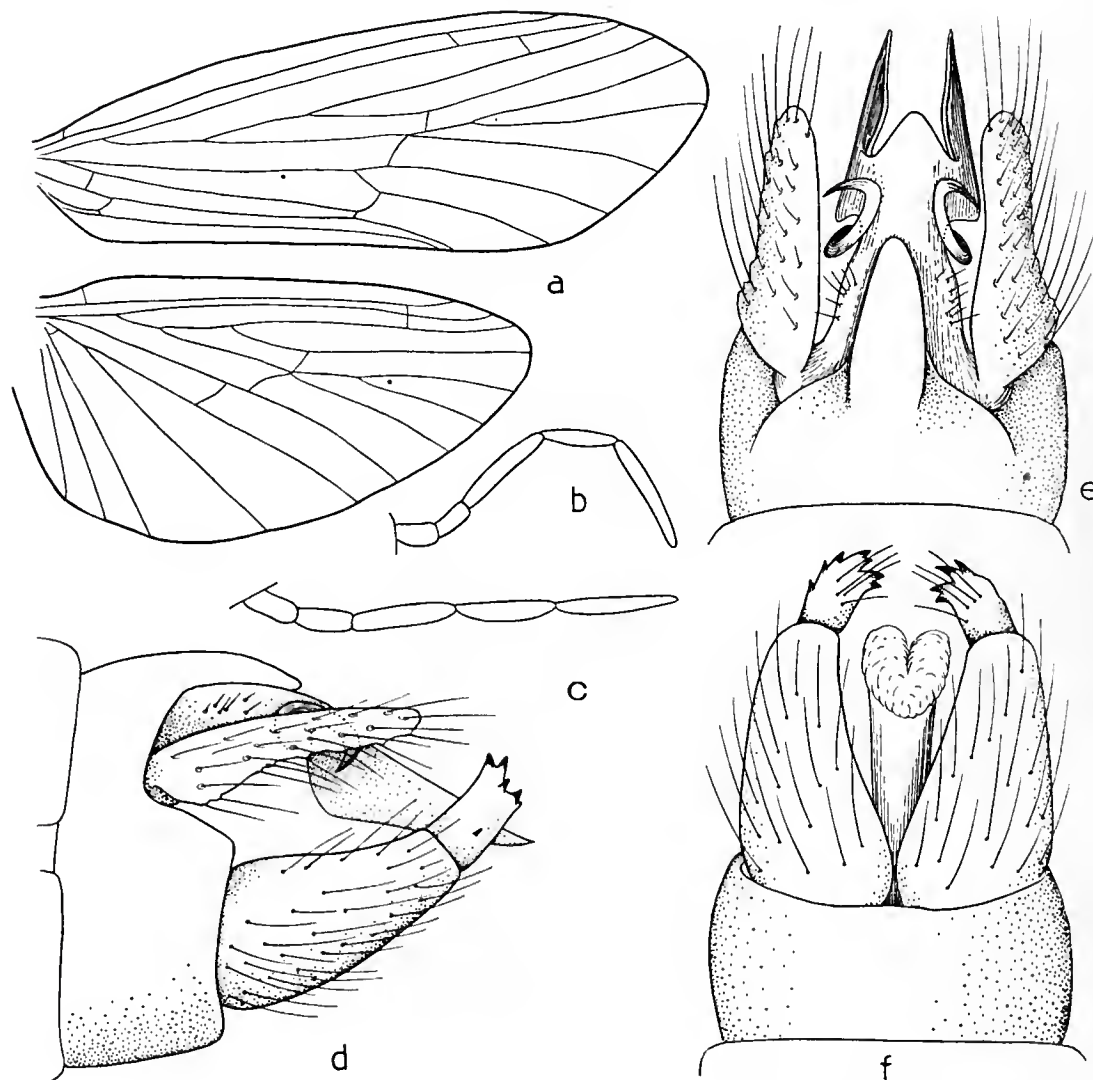


FIG. 22.—*Psilotreta indecisa* Walk.: a, wings ♂; b, maxillary palpus ♂; c, maxillary palpus ♀, from a specimen in the Betten collection; d, genitalia ♂, lateral, penis omitted, e, dorsal, f, ventral.

trough-shaped; inferior appendages two-jointed, basal joint long and stout, apical joint short, incurving and furnished at the apex with numerous black, peg-like teeth; ventral margin of the 9th sternite pigmented to give the appearance of a false excision, not shown clearly in the figure.

Milne (1936) identified with Walker's single male type the species, fairly common in the eastern United States, described and figured by Betten (1934)

as *Psilotreta frontalis*. On the basis of examination of type-specimens, not cleared, Betten suggested that *Heteroplectron*? *dissimilis* Banks and *Astoplectron connexa* Banks might fall here, and that Provancher's *Heteroplectron borealis* (not examined) might also be the same. Milne (1936) listed all of these species as synonyms of *indecisa* Walker.

We cannot follow recent writers in retaining this species even provisionally in the genus *Heteroplectron*, and prefer to use the generic name *Psilotreta* proposed by Banks for his species *frontalis* which, we judge is the same as *Psilotreta indecisa*. From the genotype of *Heteroplectron*, *californicum*, Walker's male type differs very greatly in the shape of the wings, in the spur formula, in the structure of the antennae, in having the venation considerably reduced, and in having no median cell set off in the fore wing.

MOLANNIDAE.

Molanna tryphena Betten.

(Fig. 23.)

- 1852. *Leptocerus inconspicuus* Walker, *partim*, Cat. Neur. Brit. Mus. : 71.
- 1861. *Molanna inconspicua* Hagen, Syn. Neur. N. Amer. : 275.
- 1863. *Molanna inconspicua* McLachlan, Ent. Ann. : 158.
- 1892. *Molanna inconspicua* Banks, Trans. Amer. Ent. Soc., 19 : 366.
- 1907. *Molanna inconspicua* Ulmer, Genera Insect., fasc. 60a : 150.
- 1907. *Molanna inconspicua* Banks, Cat. Neur. Ins. U.S. : 45.
- 1934. *Molanna inconspicua* Betten, N.Y. State Mus. Bull., 292 : 247.
- 1934. *Molanna tryphena* Betten, N.Y. State Mus. Bull., 292 : 248, text-fig. 55c, pl. 30, figs. 11-13.

Walker describes the species as follows :

"*Ferrugineus* ; *abdomine nigricante* ; *palpis pedibusque testaceis* ; *alae cinerae, testaceo-pubescentes*.

"Ferruginous, with pale hairs : palpi testaceous, slightly hairy : antennae about thrice the length of the body, testaceous at the base : abdomen blackish : legs testaceous : wings slightly gray, covered with testaceous down ; veins pale. Length of the body $2\frac{1}{2}$ lines ; of the wings 9-11 lines.

"*a-c*. Georgia. From Mr. Abbot's collection."

To this we add :

Head, *thorax* and *abdomen* dark brown, head above with brown hair in the middle, behind the antennae, and at the posterior angles. *Antennae* and *palpi* brown, with brown hair, the antennal joints near the head somewhat pale beneath ; *legs* pale, with black spines, the 1st pair and the tarsi of the other pairs somewhat darker ; *fore wings* brown, with very indistinct whitish patches in the middle enclosing a dark area in the region of the transverse veins, enclosing also the corneous spot in cell R_4 .

Length of the fore wing, female, 12 mm.

Genitalia, female.—Terminal dorsal segment produced in a rounded plate, at the base of which, in the centre, is a pair of minute triangular processes side

by side ; nearer to the apex of the plate, towards the lateral margins, are two rounded shoulders bearing fine bristles ; the plate is depressed between these shoulders to make a V-shaped groove ; the extreme apical margin of the plate is turned down so that it forms a large hood ; in the figure of the dorsal aspect the plate has been flattened so that its true form may be shown ; seen from beneath there is a triangular plate beneath the hood, apex slightly excised ; there is an internal structure (Fig. 23e) in connection with the vagina, beneath

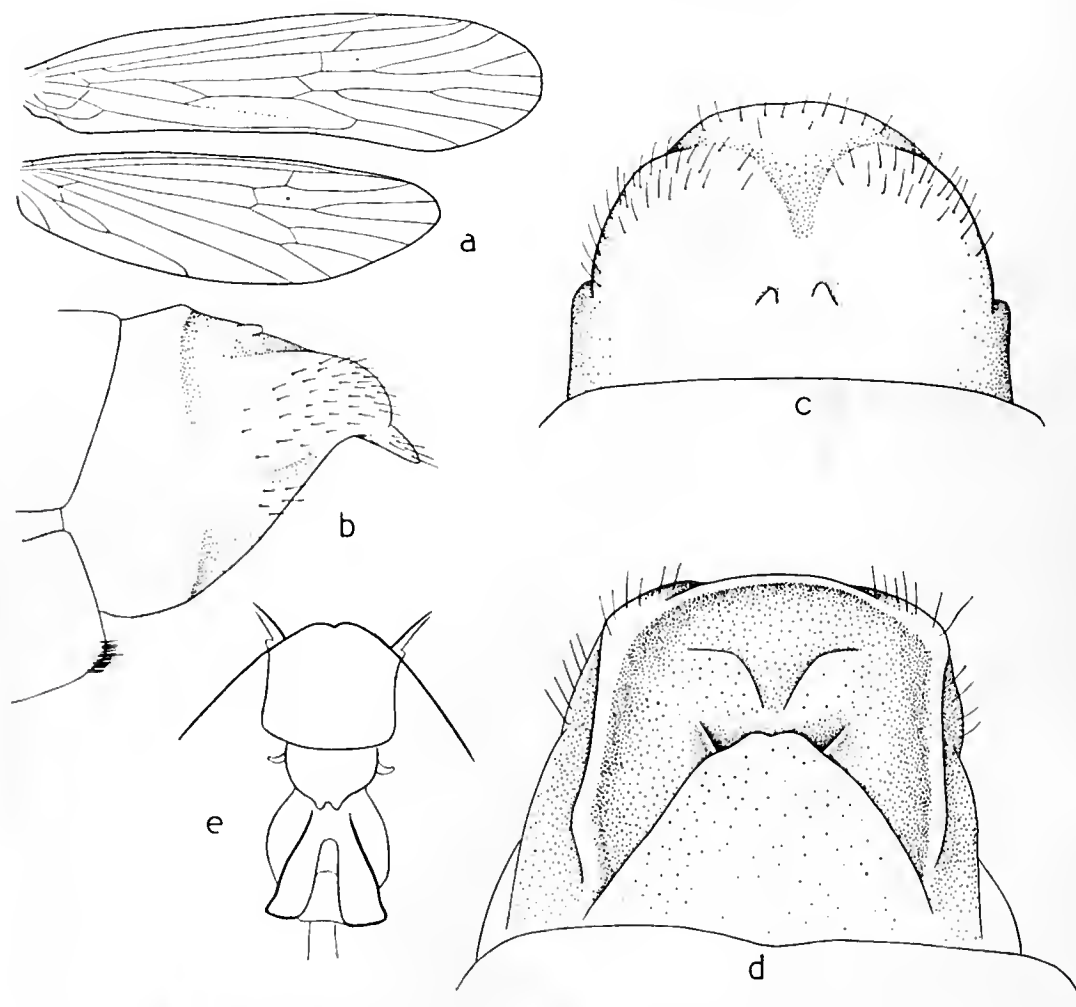


FIG. 23.—*Molanna tryphena* Betten ♀: *a*, wings ; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral ; *e*, structure of the vagina.

the triangular plate, seen in cleared examples ; its shape and structure may afford some aid to the recognition of this species ; it is very roughly hour-glass shaped. with a central body whose lower apical margin is excised.

As is noted in connection with the description of *Oecetis inconspicua*, Walker had in hand in describing that species (as *Leptocerus inconspicuus*) three specimens—one an *Hydropsychid* that cannot now be traced, one a *Molanna* and one an *Oecetis*.

For many years, following the lead of Hagen and McLachlan, the name

inconspicuus was regarded as applying to the *Molanna* ; we agree with Banks that the description is better fitted to the *Oecetis*.

We have compared the cleared genitalia of Walker's female specimen, to which the name "*inconspicua*" was formerly applied, with those of the species described and figured by Betten (1934) as *Molanna cinerea*, *musetta*, *flavicornis* and *tryphena*, and while there are minute differences, we have little hesitation in identifying the Walker specimen as *tryphena*. *Molanna blenda* Sibley remains a possibility for this identification since its female is not available for comparison, but it is not very likely that in a species as distinct as *blenda* is from *tryphena* in respect of the males, the female should prove to match Walker's specimen as closely as the female of *tryphena* does ; the question may be given further consideration when the female of *blenda* becomes known.

LEPTOCERIDAE.

Leptocerus mentieus Walker.

(Fig. 24.)

- 1852. *Leptocerus mentieus* Walker, Cat. Neur. Brit. Mus. : 71.
- 1861. *Leptocerus mentiens* Hagen, Syn. Neur. N. Amer. : 278.
- 1863. *Leptocerus mentiens* McLachlan, Ent. Ann. : 158, 162.
- 1864. *Leptocerus mentiens* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 830.
- 1877. *Leptocerus mentiens* Provancher, Le Nat. Can., 9 : 264.
- 1878. *Leptocerus mentiens* Provancher, Petite Faun. Ent. Can., 2 : 139.
- 1892. *Leptocerus mentiens* Banks, Trans. Amer. Ent. Soc., 19 : 366.
- 1907. *Leptocerus mentiens* Ulmer, Genera Insect., fasc. 60a : 136.
- 1907. *Leptocerus mentiens* Banks, Cat. Neur. Ins. U.S. : 45.
- 1934. *Athripsodes mentiens* Milne, St. N. Amer. Trich., 1 : 18.
- 1934. *Leptocerus mentiens* Betten, N.Y. State Mus. Bull., 292 : 258.
- 1934. *Leptocerus vanus* Betten, N.Y. State Mus. Bull., 292 : 262, pl. 32, fig. 7.

Walker describes the species as follows :

"*Ferrugineus ; antennae nigrae albo annulatae ; tarsi albo cincti ; alae anticae cinereo-fuscae, ferrugineo-pubescentes, posticae cinerae.*

"Ferruginous, hairy : antennae black, with a white ring on each joint : palpi slightly hairy : tarsi with white bands : wings gray ; fore-wings with a brown tinge, clothed with ferruginous down ; veins ferruginous. Length of the body $2\frac{1}{2}$ lines ; of the wings 9 lines.

"*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

We add :

Head and *thorax* very dark brown, a line of black hairs across the head, angled forward in the middle, a bunch of black and some white hair at the posterior margin of the eye directed toward the middle line, a similar bunch of hair at the anterior margin of the eye, directed forward ; *antennae* dark brown with a narrow circle of white at each joint, the 1st joint as long as the head, covered with some pale hair ; palpi dark brown, hairy, the 4th and 5th

joints flexible; *prothorax* with black and some white hair toward each side above; *legs* brown with inconspicuous, short, white hair, longer on the coxae; the tarsi of all the legs mostly white, tipped with brown; the *left wing*, which is not so completely denuded as the other, shows in general a brown colour, with some pale hairs, a small fleck of these at the tip of the anal veins.

Length of the fore wing, male, 9 mm.

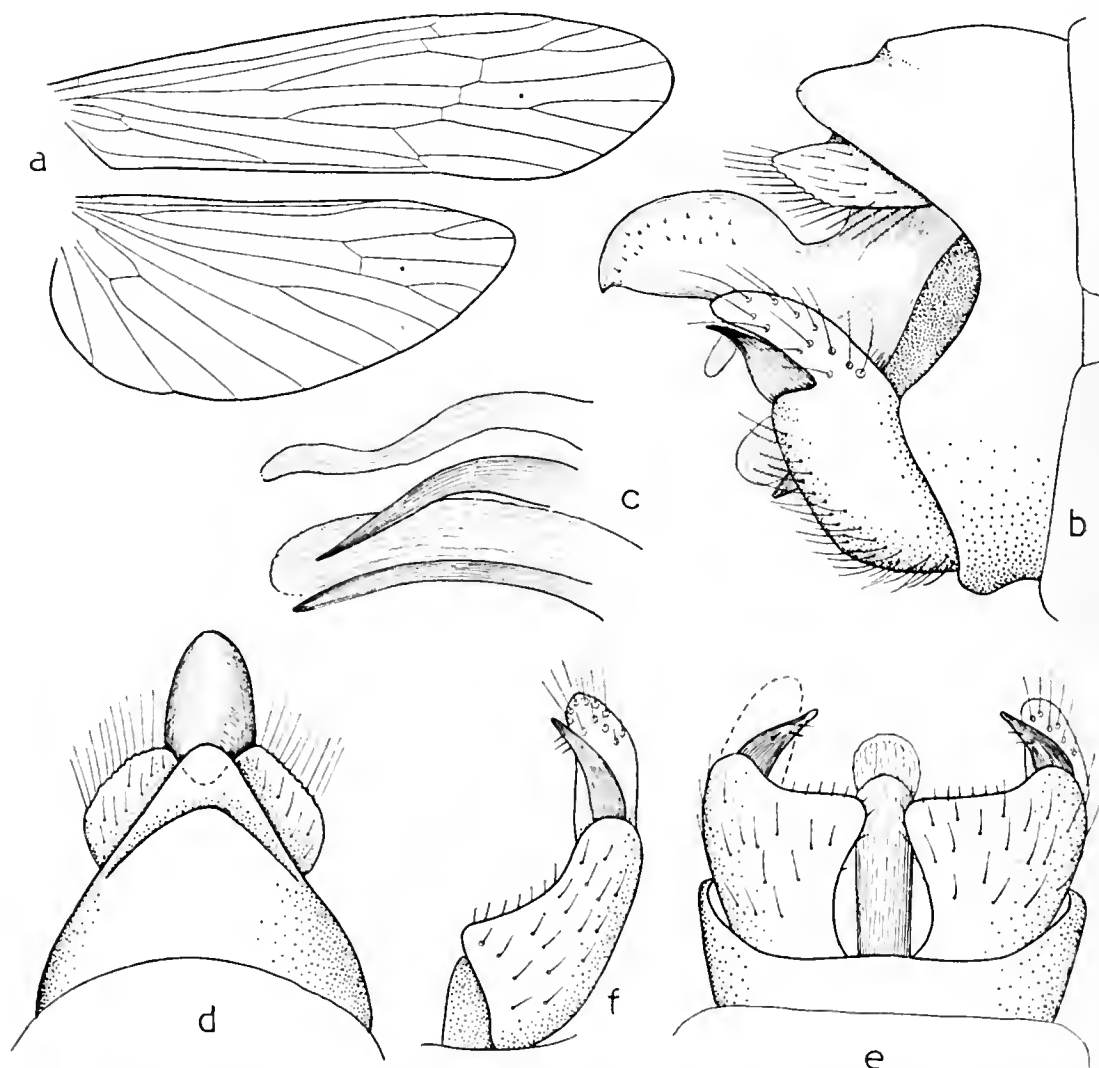


FIG. 24.—*Leptocerus mentieus* Walk. ♂: *a*, wings; *b*, genitalia, lateral; *c*, penis-cover, etc., lateral; *d*, genitalia, dorsal, *e*, ventral; *f*, an inferior appendage, from behind.

Genitalia, male.—Apical margin of the 9th tergite with a pair of triangular projections at its centre, one above and within the other; superior appendages, from the side, short, somewhat quadrate, apical margin serrate; from above margins obliquely rounded; upper penis-cover, from the side, with a deep, rounded excision of the upper margin near the base; the cover then forms a deep hood with a convex upper margin; on the lower margin, at its base, is a rounded projection bearing a few teeth; above the penis, which is retracted, is

a small curving plate ; penis sheaths straight in the type, lying above the penis (in an example in the Betten collection, from Buffalo, N.Y., the sheaths are strongly curved) ; there is a transparent lower penis-cover, closely underlying the penis ; inferior appendages two-jointed ; they are very large at the base ; about midway there is a strong angular excision of the lower margin in which is set a small second joint, dilated and rounded at the base, with the apex produced in a fine spine ; the apex of the main joint of the appendage is membranous and fringed with bristles ; from beneath the appendages are much dilated, showing a strong angular projection about midway along the inner margin, after which they diverge widely ; seen from the side, there is a strong angular projection of the lateral margin of the 9th segment.

There is a single male specimen, evidently much rubbed, and lacking parts of the antennae.

Ever since Hagen, in 1861, suggested that his *L. lugens* might be the same as *mentieus*, it has been customary to list it as a synonym. A comparison of our figure of the genitalia of *mentieus* with that given by Ulmer of one of Hagen's types of *lugens* (*Cat. Coll. Selys.*, 1907, 6 (1) : 43, figs. 65-67) would indicate that this identification cannot be correct.

Milne (1934) placed as synonyms of *mentieus*, Hagen's *L. dilutus* and Banks's *L. futilis*, *recurvatus* and *retractus*. Of these, we have seen only a male of *dilutus* presented to the British Museum by Hagen, and this specimen is not the same as *mentieus*.

The species described by Betten (1934) under the name "*vanus*" certainly belongs here.

Leptocerus resurgens Walker.

(Fig. 25.)

- 1852. *Leptocerus resurgens* Walker, Cat. Neur. Brit. Mus. : 70.
- 1861. *Leptocerus variegatus* Hagen, Syn. Neur. N. Amer. : 278.
- 1861. *Setodes resurgens* Hagen, Syn. Neur. N. Amer. : 282.
- 1863. *Setodes resurgens* McLachlan, Ent. Ann. : 159.
- 1864. *Leptocerus variegatus* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 831.
- 1864. *Setodes resurgens* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 883.
- 1892. *Leptocerus variegatus* Banks, Trans. Amer. Ent. Soc., 19 : 366.
- 1892. *Setodes resurgens* Banks, Trans. Amer. Ent. Soc., 19 : 366.
- 1907. *Leptocerus resurgens* Ulmer, Genera Insect., fasc. 60a : 136.
- 1907. *Leptocerus variegatus* Ulmer, Genera Insect., fasc. 60a : 136.
- 1907. *Leptocerus resurgens* Banks, Cat. Neur. Ins. U.S. : 45.
- 1907. *Leptocerus variegatus* Banks, Cat. Neur. Ins. U.S. : 45.
- 1934. *Athripsodes resurgens* Milne, St. N. Amer. Trich., 1 : 15, 18 (*variegatus* reduced to synonymy).
- 1934. *Leptocerus aspinosus* Betten, N.Y. State Mus. Bull., 292 : 255, pl. 31, figs. 5-10.
- 1936. *Athripsodes variegatus* Ross, Psyche, 45 : 22 (type-specimen of *variegatus* designated ; *variegatus* and *aspinosus* listed as synonyms of *resurgens*).

Walker describes the species as follows :

"*Fuscus, albido-hirtus ; alae anticae fuscae albo maculatae, posticae cinerae.*

"Brown, with a hoary tinge, clothed with whitish hairs : palpi and legs tawny,

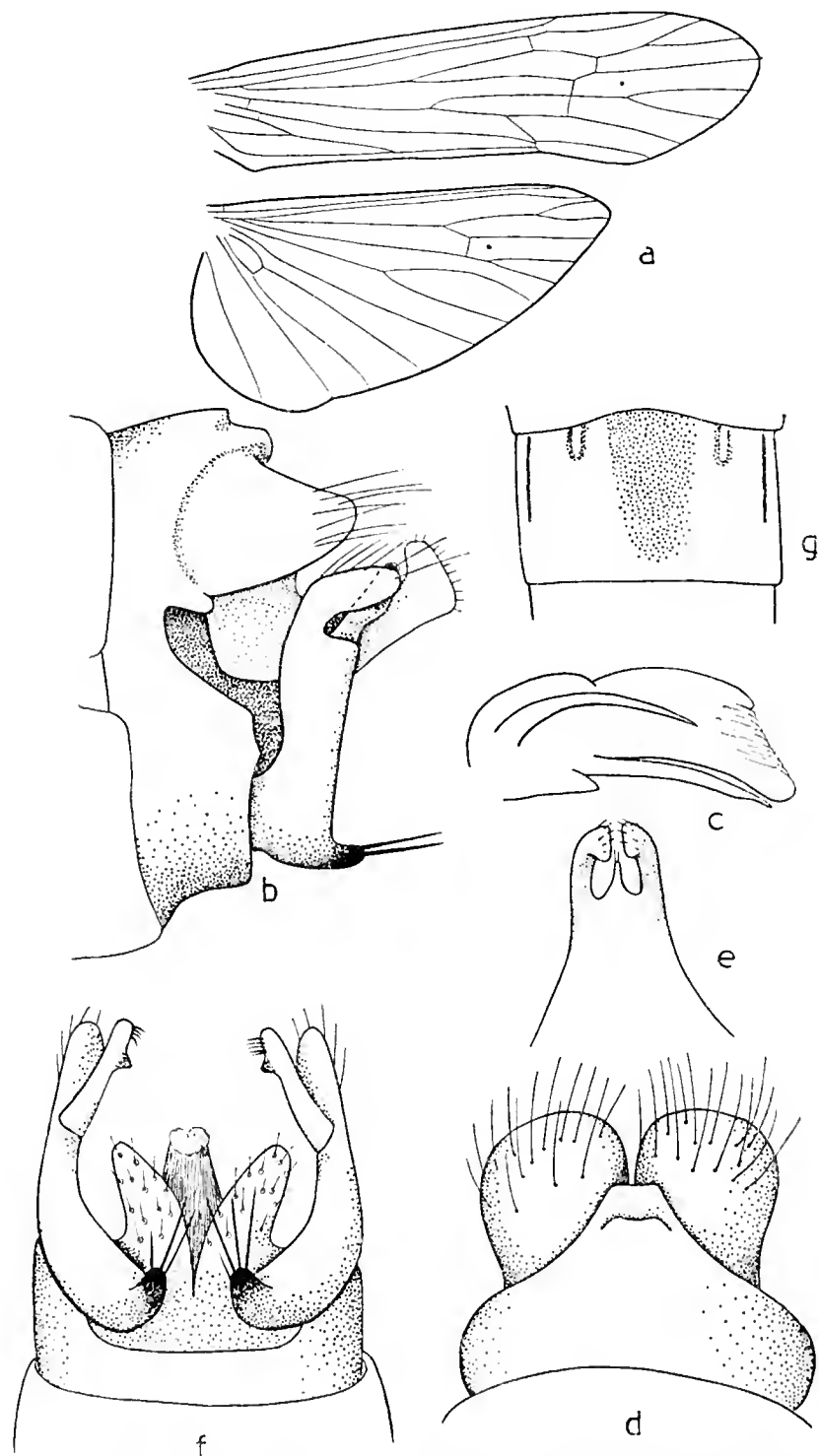


FIG. 25.—*Leptocerus resurgens* Walk. ♂: *a*, wings; *b*, genitalia, lateral; *c*, penis and sheaths, lateral; *d*, genitalia, dorsal; *e*, upper penis-cover, dorsal; *f*, genitalia, ventral; *g*, pattern on tergites.

with whitish down : palpi not hairy : fore-wings brown, with white spots at the base and about the middle and with a white spot on the tip of each apical areolet : hind-wings gray. Length of the body $3\frac{1}{2}$ lines ; of the wings 14 lines.

"a. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

To this we add :

Head dark brown, with black and white hair above, and with a bunch of brown hair and a few white hairs extending forward from the margin of the eye ; *antennae* (broken) with the 1st joint bulbose, with some pale hair ; palpi brown, covered with dark hair, the 4th and 5th joints flexible ; mesonotum dark brown with some white hair in a median longitudinal line ; the *fore legs* dark brown, the tarsi with indistinct paler markings, the femur bordered with a row of hairs as long as the width of that joint, 2nd and 3rd legs brown, closely covered with short, white hair ; *wings* dark brown, the veins still darker, some white hair scattered over the fore wing, distinct white patches at the base in the region of the cross-veins, at the centre of the wing where M and Cu_1 separate, at the tips of the anal veins, at the base of cell Cu_{1a} , at cross-veins $r-m$ and m , one each at the tips of M_1 , M_2 , Cu_1 , Cu_{1a} , and one extending broadly from the cross-vein of the sector to the anterior margin of the wing ; the abdominal segments have a dorsal design consisting of a dark patch in the centre with a smaller dark patch at the side, the small patch with a still darker pigmented outline.

Length of the fore wing, 13 mm.

Genitalia, male.—The 9th dorsal segment produced at its centre in a pair of blunt triangles, one inside and above the other ; superior appendages from above, broad, somewhat quadrate ; from the side, bluntly triangular ; upper penis-cover large ; there appears to be a central spur, below which are two processes shaped like a pair of legs and, as seen from the side, with the toes of the boots directed upwards ; from above, the apex of the plate is bifurcate, each fork with a dilated, inturned apex and the central spur arising from a rather broad base between them ; penis short and retracted, with a short spine-like sheath on each side, only visible in a cleared example, and a narrow plate beneath, seen as a spine from the side ; inferior appendages directed upwards, two-jointed ; the main joint membranous at its apex, directed distally, and bearing a strong fringe along its upper margin ; the 2nd joint, seen from behind, is inserted in an angular excision towards the apex of the appendage, and bears a small triangular projection on its inner margin before the apex, which is directed slightly inwards, and bears a few short bristles on its inner surface ; seen from behind is a pair of leaf-like branches arising from the inner margin of the appendages at their bases and set with short spines, apices diverging ; from the side, the base of the appendage is produced in a short process, darkly pigmented and directed distally, bearing a bunch of long bristles.

There is a single type-specimen, a male.

Hagen (1864 : 882) reduced his own species *Leptocerus cinerascens* to

synonymy under *resurgens*. This misled Betten (1934) into listing *resurgens* under *Oecetis*, where *cinerascens* belongs, and he identified *O. fumosa* with it, but examination of the Walker type reveals that it is not at all like *cinerascens*.

We place *L. aspinosus* Betten as a synonym of *resurgens*, though two specimens in the Betten collection, used for comparison and bearing locality labels "Charlton, Ontario", and "Lake Nipissing, Ontario", do not show the small triangular projection on the 2nd joint of the inferior appendage.

Having examined the Hagen type of *Leptocerus variegatus* in 1915, Betten reported (1934 : 263) that it had a long tooth on the inner margin of the inferior appendage, and he described as *L. aspinosus* a related species lacking this striking character. This latter species we find to be identical with *resurgens* Walker. Ross, having examined Hagen's type of *variegatus* after the parts had been cleared, informed us (1938) that the spine is not present, and this name therefore also falls as a synonym under *resurgens* Walker.

***Leptocerus submacula* Walker.**

(Fig. 26.)

- 1852. *Leptocerus submacula* Walker, *partim*, Cat. Neur. Brit. Mus. : 70.
- 1861. *Leptocerus albostictus* Hagen, Syn. Neur. N. Amer. : 276.
- 1861. *Leptocerus submacula* Hagen, *partim*, Syn. Neur. N. Amer. : 278.
- 1863. *Leptocerus submacula* McLachlan, *partim*, Ent. Ann. : 162.
- 1864. *Leptocerus albostictus* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 827.
- 1864. *Leptocerus submacula* Hagen, *partim*, Verh. Zool. Bot. Ges. Wien, **14** : 831.
- 1892. *Leptocerus albostictus* Banks, Trans. Amer. Ent. Soc., **19** : 366.
- 1892. *Leptocerus submacula* Banks, *partim*, Trans. Amer. Ent. Soc., **19** : 366.
- 1907. *Leptocerus albostictus* Ulmer, Genera Insect., fasc. **60a** : 135.
- 1907. *Leptocerus submacula* Ulmer, *partim*, Genera Insect., fasc. **60a** : 136.
- 1907. *Leptocerus albostictus* Banks, Cat. Neur. Ins. U.S. : 45.
- 1907. *Leptocerus submacula* Banks, *partim*, Cat. Neur. Ins. U.S. : 45.
- 1934. *Athripsodes submacula* Milne, St. N. Amer. Trich., **1** : 14, 18.
- 1934. *Athripsodes albostictus* Milne, St. N. Amer. Trich., **1** : 14, 18.
- 1934. *Leptocerus albostictus* Betten, N.Y. State Mus. Bull., **292** : 254.
- 1934. *Leptocerus submaculus* Betten, N.Y. State Mus. Bull., **292** : 260, pl. 32, figs. 1-4.
- 1936. *Athripsodes submaculus* Milne, St. N. Amer. Trich., **3** : 57-58 (*albostictus* reduced to synonymy).
- 1938. *Athripsodes albostictus* Ross, Psyche, **45** : 20 (type of *albostictus* Hagen designated).

Walker describes the species as follows :

"*Niger, tibiis tarsisque testaceis ; alae cinereae, anticae maculis tribus albidis, una basali, 2a subcostali, 3a postica.*

"Black, clothed with black hairs : palpi hairy : antennae very slender, about thrice the length of the body ; tibiae and tarsi testaceous : wings gray ; fore-wings sprinkled with whitish down, adorned with three whitish spots, one in the middle near the base, the second on the anterior or discal anastomosis, the third on the arculus ; veins black. Length of the body $3\frac{1}{2}$ -4 lines ; of the wings 10-12 lines.

"*a, b.* River St. Lawrence. Presented by E. Doubleday, Esq."

To this we add :

Eyes of the male very large and closely approximated ; *antennae* close

together in the anterior angle between the eyes ; *head* with black hair behind the antennae and between the eyes ; two tufts of dark brown hairs, long and

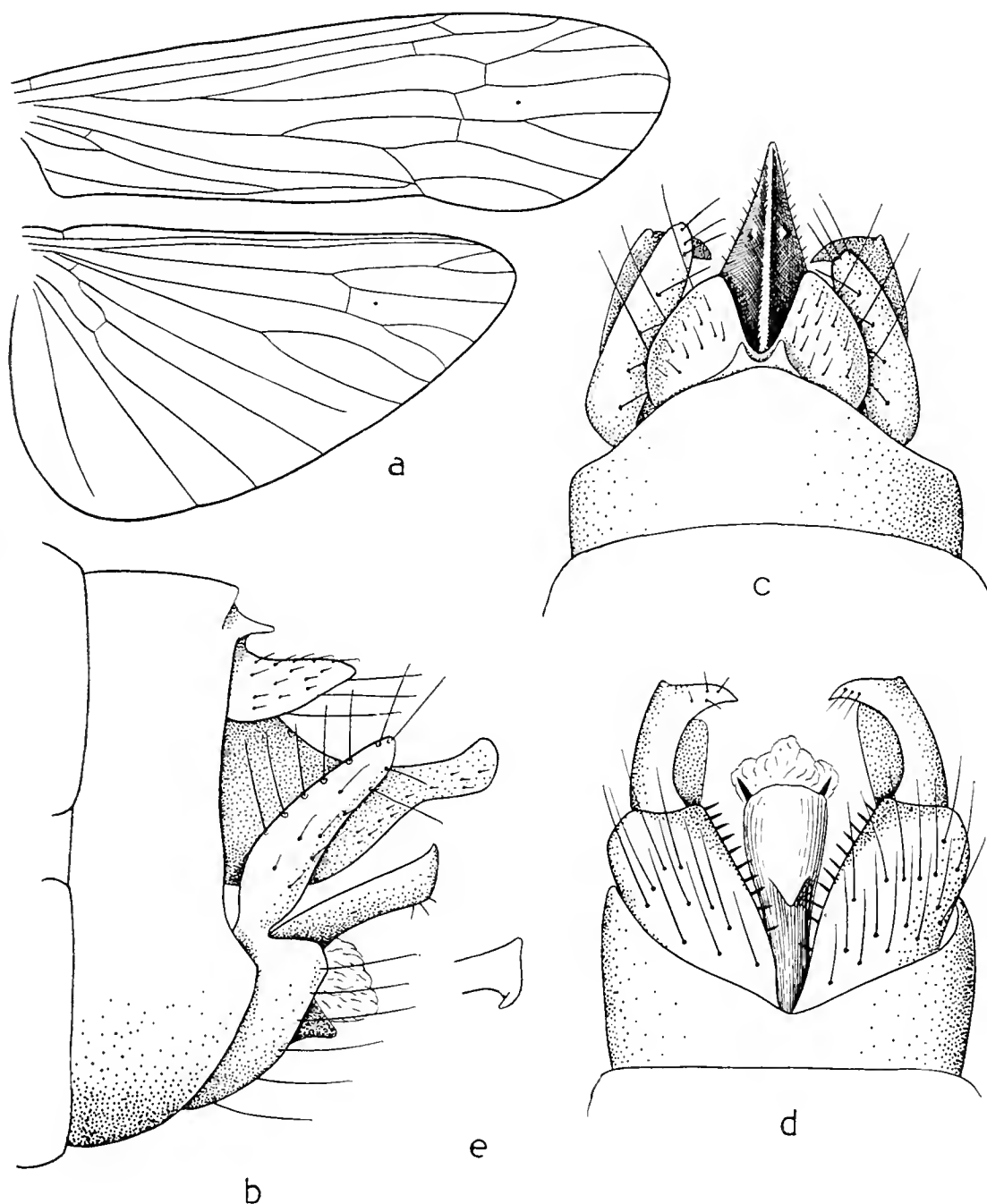


FIG. 26.—*Leptocerus submacula* Walk. ♂ : *a*, wings ; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral ; *e*, apex of the 2nd joint of the inferior appendage, from within.

thin, in front of the eyes ; basal joint of the antennae deep brown, covered with long, black hair, the succeeding joints brown ; those in the basal third each

show a white spot beneath ; palpi covered with long, brown hair ; mesonotum black, with a few yellowish hairs ; tegulae with brown hair ; *legs* brown, the tarsi pale, each joint tipped with brown ; *wings* brown, with a very scanty covering of short, black hair and with a very few white scales.

Length of the fore wing, male, 10 mm.

Genitalia, male.—Apical margin of the 9th tergite produced and rounded with two minute, finger-like projections at its centre ; superior appendages large ; from above, outer margins convex with a wide excision between them extending nearly to the base ; upper penis-cover forming a very long and acute hood, lateral margins set with widely spaced, small, thorn-like bristles, the centre raised in a narrow longitudinal keel ; from the side the cover is broad at its base, apex somewhat clavate ; penis retracted and visible clearly only from beneath ; at its apex from this aspect are two short, divergent, black spurs, and midway is a basally-directed, large, triangular lobe ; inferior appendages two-jointed, the main joint broad at its base, long and finger-like at the apex ; 2nd joint set in an angular excision about midway ; apex acute and turned inward at right angles as seen from above and beneath, directed upward from the side ; from beneath, the bases of the appendages are broad, with inner margins set with regularly spaced, peg-like teeth ; apical margin of the 9th sternite widely excised.

There are in the British Museum collection three specimens over the label "*submacula*", one male and two females collected at the St. Lawrence River by Doubleday, and numbered 586, 587 and 588. Walker lists but two of these, *a* and *b*, in his description, and we cannot be altogether certain which of the three were before him. In order not to upset the names recently assigned by Milne (1936), we assume that the male, numbered 588, was in Walker's hands, and this male we designate as the type of *submacula*.

The abdomen of the type-specimen was unfortunately lost in the course of our study, but not until after both authors had compared the genitalia with those of a specimen in the Betten collection and had found them to agree in every particular. The description and figures here included are from this latter specimen.

It may be noted that males from Buffalo, New York, in the Betten collection, of which we have examined cleared genitalia and of which one is here figured, agree fully with Walker's type as to genitalia and in having brown hairs before the eye margins, but they have a varying amount of white hair in the middle of the face.

Milne states that the two females in the British Museum belong to his new species *Athripsodes erraticus*. In the Betten collection there are males of two species resembling *submacula* in having white scales on the fore wings, and differing in that the hairs before the eyes are mostly white, and in that the eyes are not closely approximated. One of these is *A. erraticus* Milne, and the other has more recently been described by Ross as *A. saccus*. The existence of these two very similar species makes the specific identification of the two females in the Museum collection somewhat uncertain.

Leptocerus erraticus (Milne).

(Fig. 27.)

1852. *Leptocerus submacula* Walker, *partim*, Cat. Neur. Brit. Mus. : 70.
 1861. *Leptocerus submacula* Hagen, *partim*, Syn. Neur. N. Amer. : 278.
 1863. *Leptocerus submacula* McLachlan, *partim*, Ent. Ann. : 162.
 1864. *Leptocerus submacula* Hagen, *partim*, Verh. Zool. Bot. Ges. Wien, 14 : 831.
 1892. *Leptocerus submacula* Banks, *partim*, Trans. Amer. Ent. Soc., 19 : 366.
 1906. *Leptocerus submacula* Ulmer, Notes Leyd. Mus., 28 : 35, fig. 41.
 1907. *Leptocerus submacula* Ulmer, *partim*, Genera Insect., fase. 60a : 136.
 1907. *Leptocerus submacula* Banks, *partim*, Cat. Neur. Ins. U.S. : 45.
 1934. *Athripsodes submacula* Milne, *partim*, St. N. Amer. Trich., 1 : 14, 18.
 1936. *Athripsodes erraticus* Milne, St. N. Amer. Trich., 3 : 57-58.
 1938. *Athripsodes erraticus* Ross, Ann. Ent. Soc. Amer., 31, pl. 1, figs. 6, 6A.

Walker describes *L. submacula* as follows :

"*Niger, tibiis tarsisque testaceis ; alae cinereae, anticae maculis tribus albidis, una basali, 2a subcostali, 3a postica.*

"Black, clothed with black hairs : palpi hairy : antennae very slender, about thrice the length of the body ; tibiae and tarsi testaceous : wings gray ; fore-wings sprinkled with whitish down, adorned with three whitish spots, one in the middle near the base, the second on the anterior or discal anastomosis, the third on the arculus ; veins black. Length of the body $3\frac{1}{2}$ -4 lines ; of the wing 10-12 lines.

"*a, b.* River St. Lawrence. Presented by E. Doubleday, Esq."

Additional description and notes :

Head black above, with scattered white hair ; adjacent to each eye in front, a conspicuous bunch of mostly white hair ; eyes (female) not closely approximate ; *antennae* (broken) with very small, white flecks beneath on the more basal joints ; palpi brown, with short, dark brown and white hair ; mesonotum black, with sparse white hair in the middle ; *thorax* black beneath, with pale hair ; *legs* covered with short, white hair, the femora brown, the tibiae and tarsi lighter, the tarsi tipped with brown ; *fore wings* brown, the costal margin somewhat transparent, the veins darker brown ; there is a covering of short, black hair and a fairly uniform distribution of white scales ; a conspicuous white spot at the tips of the anal veins formed of white scales and a few white hairs, this being the only one of the three whitish spots of Walker's description that can now be seen.

Length of the fore wing, female, 10 mm.

Genitalia, female.—The apical margin of the terminal dorsal segment rounded ; beyond it is a pair of round plates with a cleft between, at the base of which is a small triangular projection ; from beneath, below this is a pair of small plates, set edgewise on the segment with their apices nearly touching ; between these plates is a vulvar scale, the middle lobe slightly longer than the two side lobes ; below this the segment is apparently divided in three wide, rounded lobes of which the middle is the shortest ; there is an internal structure connected with the vagina in the form of a deep cup with a longitudinal marking in the centre, and a conical body with convex sides inserted in the opening.

As stated in connection with the description of *Leptocerus submacula*, there are under that name in the Museum collection three specimens, one male and two females, only two of which are mentioned by Walker. The male has been designated the type of *submacula*. Milne referred the females to his new species *A. erraticus*. This identification may perhaps be regarded as pro-

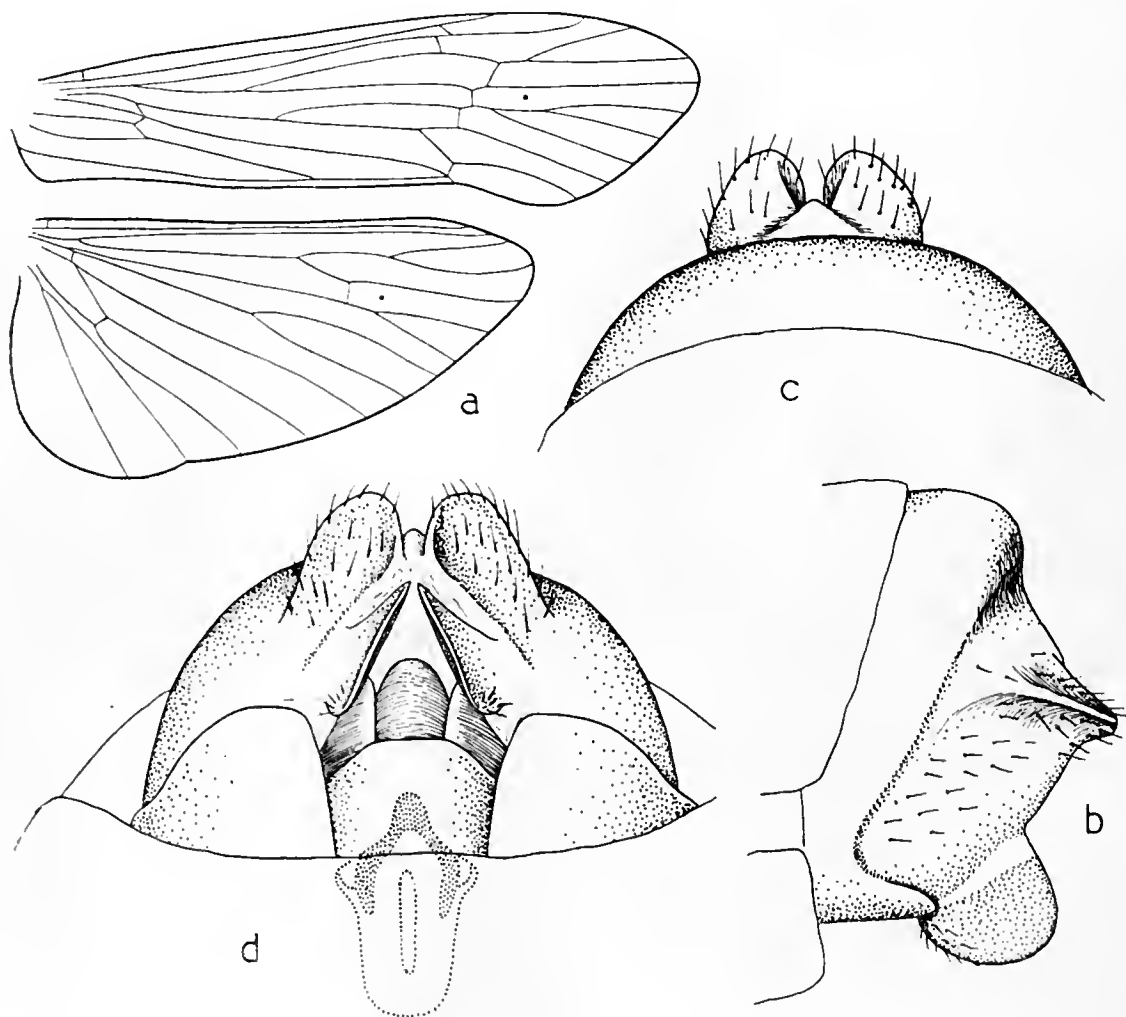


FIG. 27.—*Leptocerus erraticus* Milne ♀: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

visional inasmuch as there is, aside from *erraticus*, at least one species, *saccus* Ross, having general resemblance to *submacula*, but differing in having the hair before the eyes white and relatively shorter and stiffer. The Museum specimens do correspond closely to a female paratype of *erraticus* Milne kindly lent to us by Mr. Nathan Banks, and we therefore include above the description of the genitalia of one of them. The female of *saccus* has not been described.

Leptocella albida (Walker).

(Fig. 28.)

1852. *Leptocerus albidus* Walker, Cat. Neur. Brit. Mus. : 71.
 1861. *Setodes nivea* Hagen, Syn. Neur. N. Amer. : 281.
 1861. *Setodes albida* Hagen, Syn. Neur. N. Amer. : 283.
 1863. *Setodes albida* McLachlan, Ent. Ann. : 159 (*nivea* reduced to synonymy).
 1864. *Setodes albida* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 882, 883 (*nivea* Hagen listed as synonym).
 1877. *Setodes albida* Provaneher, Le Nat. Can., **9** : 265.
 1878. *Setodes albida* Provaneher, Petite Faun. Ent. Can., **2** : 140.
 1892. *Setodes albida* Banks, Trans. Amer. Ent. Soc., **19** : 366.
 1894. *Setodes albida* Banks, Ent. News, **5** : 180.
 1904. *Leptocella albida* Banks, Proc. Ent. Soc. Wash., **6** : 213.
 1907. *Leptocella albida* Ulmer, Genera Insect., fasc. **60a** : 138.
 1907. *Leptocella albida* Banks, Cat. Neur. Ins. U.S. : 45.
 1934. *Leptocella albida* Betten, N.Y. State Mus. Bull., **292** : 264, pl. 32, figs. 9-14 ; pl. 33, figs. 1-8.
 1936. *Leptocella albida* Milne, St. N. Amer. Trieh., **1** : 19.

Walker describes the species as follows :

"*Fuscus, albo-hirtus ; antennae basi albo annulatae ; palpi testacei ; pedes albidii ; alae albidae, venis testaceis.*

"Brown, clothed with white hairs : antennae about four times the length of the body, with white rings on the joints towards the base : palpi testaceous : legs whitish : wings whitish, with testaceous veins. Length of the body $3\frac{1}{4}$ lines ; of the wings 12 lines.

"*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

Additional description and notes :

Head light brown above, with long, white hair and with white scales, these latter closely covering the area adjacent to the eyes ; white hairs also before the antennae, and a group of black hairs in front of the eyes ; basal joint of the *antennae* covered with white hair, the 2nd joint also pale, the next succeeding joints pale at base and brown at the distal end ; palpi brown, covered with short hair ; mesonotum black with median areas covered with white hair ; *legs* yellow, covered with white hair, rather long on the hind tibiae ; *abdomen* black, with the posterior margins of the segments and the lateral line brown ; genital appendages brown ; *fore wings* white, the veins pale yellow ; the wings are practically denuded, with a few pale and a few black hairs remaining ; the left wing has four inconspicuous flecks of black hair on the anterior margin, two about opposite the cross-vein of the sector, and one on either side of the tip of R_2 ; the tip of R_2 is covered with pale hair.

Length of the fore wing, male, 13 mm.

Genitalia, male.—Apical margin of the 9th segment strongly produced and triangular ; arising from slightly beneath the apex of the triangle are two small, leaf-like processes, somewhat spindle-shaped ; these probably represent the superior appendages ; towards the apex, the lateral margin of the segment is produced in a pair of long processes, dilating on the lower margin (from the

side) and the inner margin (from above) towards their apices; the dilated margins are fringed with rather short bristles, heavily at the apices; opposite the pleurite of the 8th segment, the margin of the 9th is again produced in

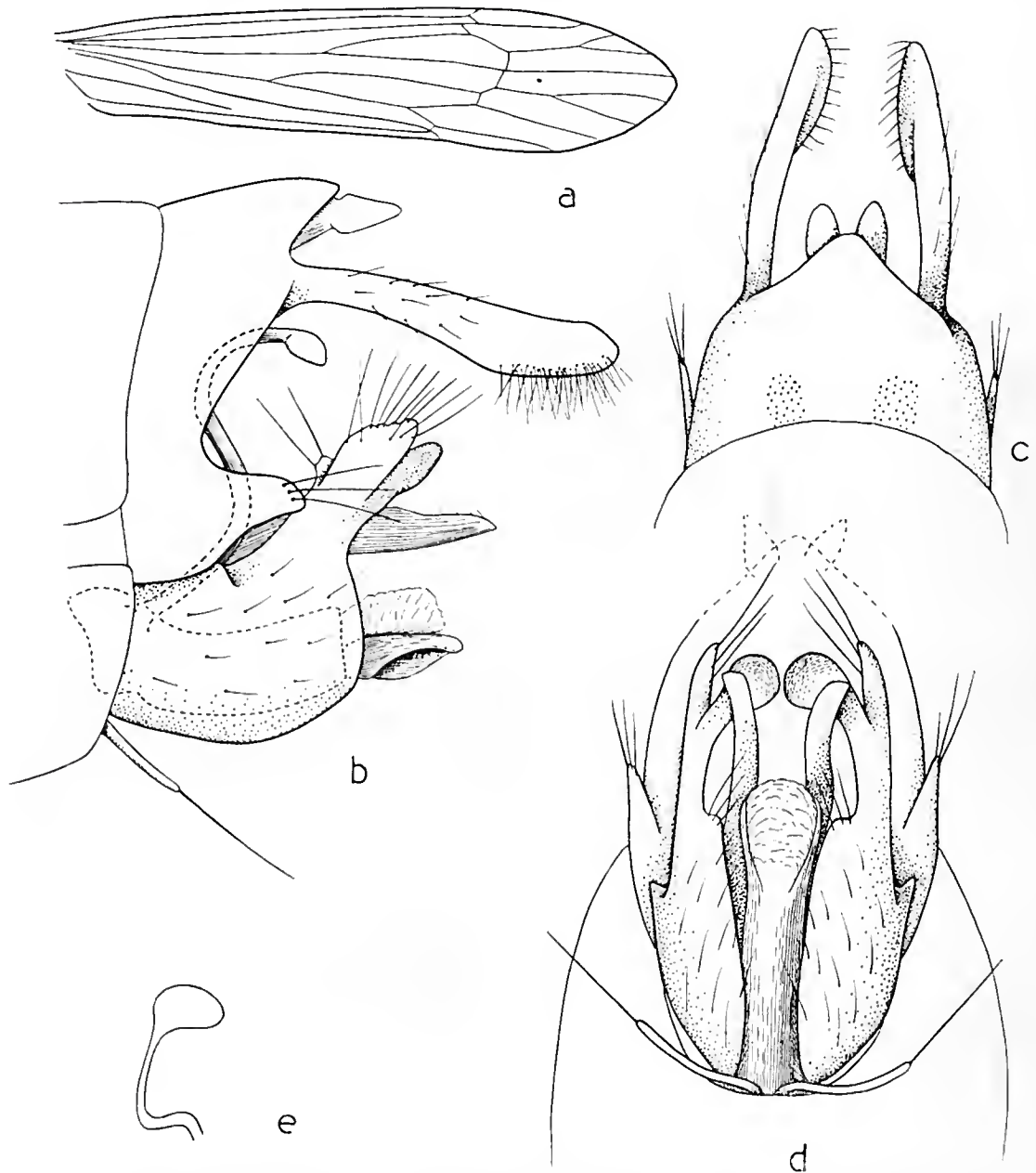


FIG. 28.—*Leptocella albida* Walk. ♂: *a*, anterior wing; *b*, genitalia, lateral, *c*, dorsal; *d*, inferior appendages, penis, upper penis-cover, etc., from beneath and behind (penis-sheaths omitted); *e*, penis-sheath, from above.

a strong triangular side-piece; the lower margin of the segment is not well defined; upper penis-cover furcate, the forks long, stout, with the apices from beneath, slightly diverging; penis short and stout with a pair of S-shaped sheaths which, from the side, terminate in dilated apices, the whole

sheath, from this aspect, resembling the head and neck of a snake; lower penis-cover, from beneath, short and spatulate; inferior appendages bifurcate, very broad at the base; from the side, the upper branch is of about the same length as the lower, but much broader, apex obliquely truncate; from beneath, the lower and inner branch terminates in a nearly circular apex with a granulate surface; there is a pair of slender filaments arising at the centre of the margin of the 8th sternite, each filament terminating in a fine bristle.

The single type-specimen lacks one hind wing and the other is damaged. One of the extremely long antennae remains intact.

We note what is perhaps a generic character, namely, that in the males the anal angle of the hind wing is greatly expanded, so that the wing margin is indented at the tip of 3rd A.

The synonymy of the North American species of *Leptocella* is in a difficult and unsatisfactory state. There are evidently a number of related forms in which no structural differences of consequence have been discovered, and in which the colour differences, while very striking in their extremes, are rendered unreliable by intergradations. Milne (1934) consequently placed thirteen names as synonyms, and gave a key to them as colour varieties. This may prove to be the only feasible course to follow, but we prefer to list separately the two species, *albida* and *exquisita*, found amongst the Walker types in the British Museum. In the bibliography we have included only the references in which these two specific names are used and also the reference to *nivea* Hagen, since that name was reduced to synonymy by its own author. Reference to the several probable synonyms may be found in the papers by Vorhies (*Trans. Wisc. Acad. Sci.*, **16** : 695, 1909), Milne (1934), and Betten (1934).

Leptocella exquisita (Walker).

(Figs. 29-31.)

- 1852. *Leptocerus exquisitus* Walker, Cat. Neur. Brit. Mus. : 72.
- 1861. *Setodes exquisita* Hagen, Syn. Neur. N. Amer. : 280.
- 1863. *Setodes exquisita* McLachlan, Ent. Ann. : 162.
- 1864. *Setodes exquisita* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 882.
- 1892. *Setodes exquisita* Banks, Trans. Amer. Ent. Soc., **19** : 366.
- 1899. *Leptocella exquisita* Banks, Trans. Amer. Ent. Soc., **25** : 214.
- 1904. *Leptocella exquisita* Banks, Proc. Ent. Soc. Wash., **6** : 213.
- 1905. *Leptocella exquisita* Ulmer, Ann. k. k. Naturh. Hofmus., **20** : 73, figs. 34, 35.
- 1907. *Leptocella exquisita* Ulmer, Cat. Coll. Selys, fasc. **6**, pt. 1 : 45.
- 1907. *Leptocella exquisita* Ulmer, Genera Insect., fasc. **60a** : 138, pl. 37, fig. 7.
- 1907. *Leptocella exquisita* Banks, Cat. Neur. Ins. U.S. : 46.
- 1913. *Leptocella exquisita* Ulmer, Deutsch. Ent. Zeitschr., **1913** : 402.
- 1934. *Leptocella exquisita* Betten, N.Y. State Mus. Bull., **292** : 265, pl. 33, figs. 9, 10.
- 1936. *Leptocella albida* Milne, *partim*, St. N. Amer. Trich., **1** : 18-19.

Walker describes the species as follows :

“*Testaceus, albo-hirtus; antennae articulis basi albis; pedes albi; alae albae, anticae testaceo fasciatae maculisque quatuor apud marginem posticum nigris.*”

“Pale testaceous, clothed with white hairs: joints of the antennae white towards

the base ; those towards the tips wholly testaceous ; sutures brown : legs and wings white : fore-wings with five pale testaceous bands, the outer ones irregular ; nearer the tip are some streaks composed of blackish hairs, and at the tip there are some pale testaceous marks or interrupted bands ; five [four] black spots furnished with long black hairs in a row on the hind border near the tip ; veins white. Length of the body $2\frac{1}{4}$ lines ; of the wings $7\frac{1}{2}$ lines.

"a. Georgia. From Mr. Abbot's collection."

In the British Museum copy of Walker's *Catalogue*, in the English description, the word " five " has been altered in ink to " four ", thus corresponding with the Latin.

We add :

Head light brown above, with white hair in the middle and white scales along the margins of the eyes ; area below the bases of the antennae nude ;

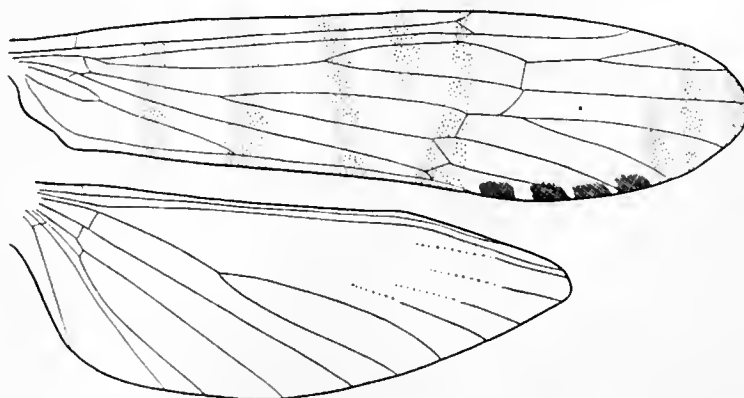


FIG. 29.—*Leptocella exquisita* Walk. ♀ (type) : wings.

basal joint of the *antennae* covered with white hair above, the 2nd joint pale ; the four others remaining are pale at base and brown at their distal ends ; palpi light brown ; *thorax* light brown, the mesonotum with some white hair ; *legs* pale yellowish, the middle and hind pairs covered with white hairs and having a row of spines on the tarsal joints ; *fore wings* transparent, with green and purple reflections ; there is a sparse covering of white and of yellow hair, the yellow forming five transverse bands before the anastomosis ; beyond this line there are scattered spots of yellow ; following along the pedicel of cell R_2 and along the cross-vein $r-m$ there is a line of dark hair, some dark hairs also on some of the apical veins, four conspicuous spots of dark brown hair on the post-apical margin between M_4 and the tip of the anal veins. As in *Leptocella albida* the male has the anal angle of the *hind wing* greatly expanded.

Length of the fore wing, 9 mm.

Genitalia, male.—The apical margin of the 9th tergite is strongly produced and triangular with a pair of minute, finger-like projections beneath the extreme apex ; the margin of the segment is produced towards the apex in a pair of long, slender processes, slightly sinuous from above and dilated at their apices

along their lower margins from the side ; it is again produced towards the base in a pair of small, irregular processes, more or less dentate, bearing a few long bristles ; upper penis-cover bifurcate, forks long, parallel, with the apices from above, truncate ; penis short and stout with a pair of S-shaped sheaths terminating in dilated, out-turned apices ; lower penis-cover from beneath, spatulate, inserted in a membranous sleeve, about as long as the upper penis-cover ; inferior appendages long, arising from broad bases, margins serrate and dilated beneath towards their bases, unequally on the two sides ; bifurcate at

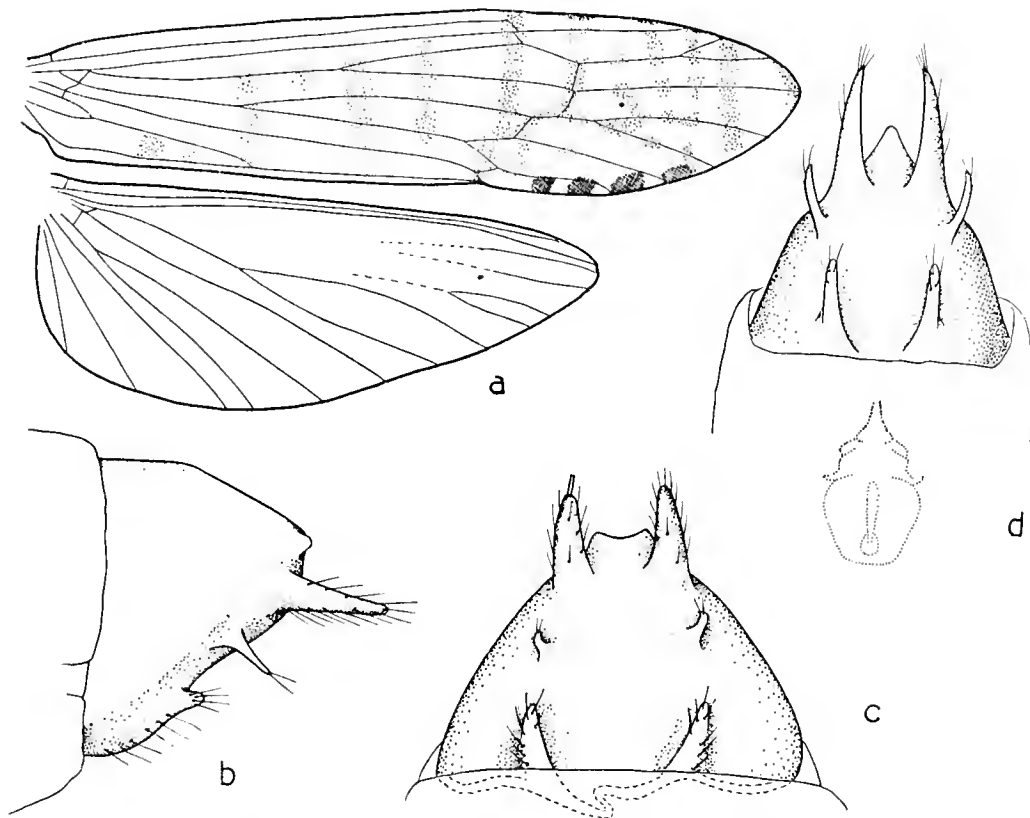


FIG. 30.—*Leptocella exquisita* Walk. ♀: *a*, wings (from a specimen presented by Mr. N. Banks); *b*, genitalia, lateral, from the same example, *c*, ventral, from the same example, *d*, ventral, from an example in the Betten collection, with the structure of the vagina.

their apices, there being an inner and an outer fork as seen from beneath, the inner much dilated and rounded, the outer finger-like ; there is a pair of short, slender filaments arising at the centre of the margin of the 8th sternite, the apex of each armed with two or three long bristles.

Genitalia, female (Banks example).—From above, the apical margin of the terminal segment is produced, the extreme apex further produced with a truncate margin with small projections at each apical angle ; below this is a pair of rather long, finger-like processes with their outer margins and apices fringed with shortish hairs ; from beneath there are two more pairs of finger-like processes, all the pairs placed immediately one below the other. The example

from the Betten collection, while having the genitalia formed in a like general pattern, differs in detail.

The type of the species is from Georgia and without an abdomen. The shape and size of the wings show that it is a female.

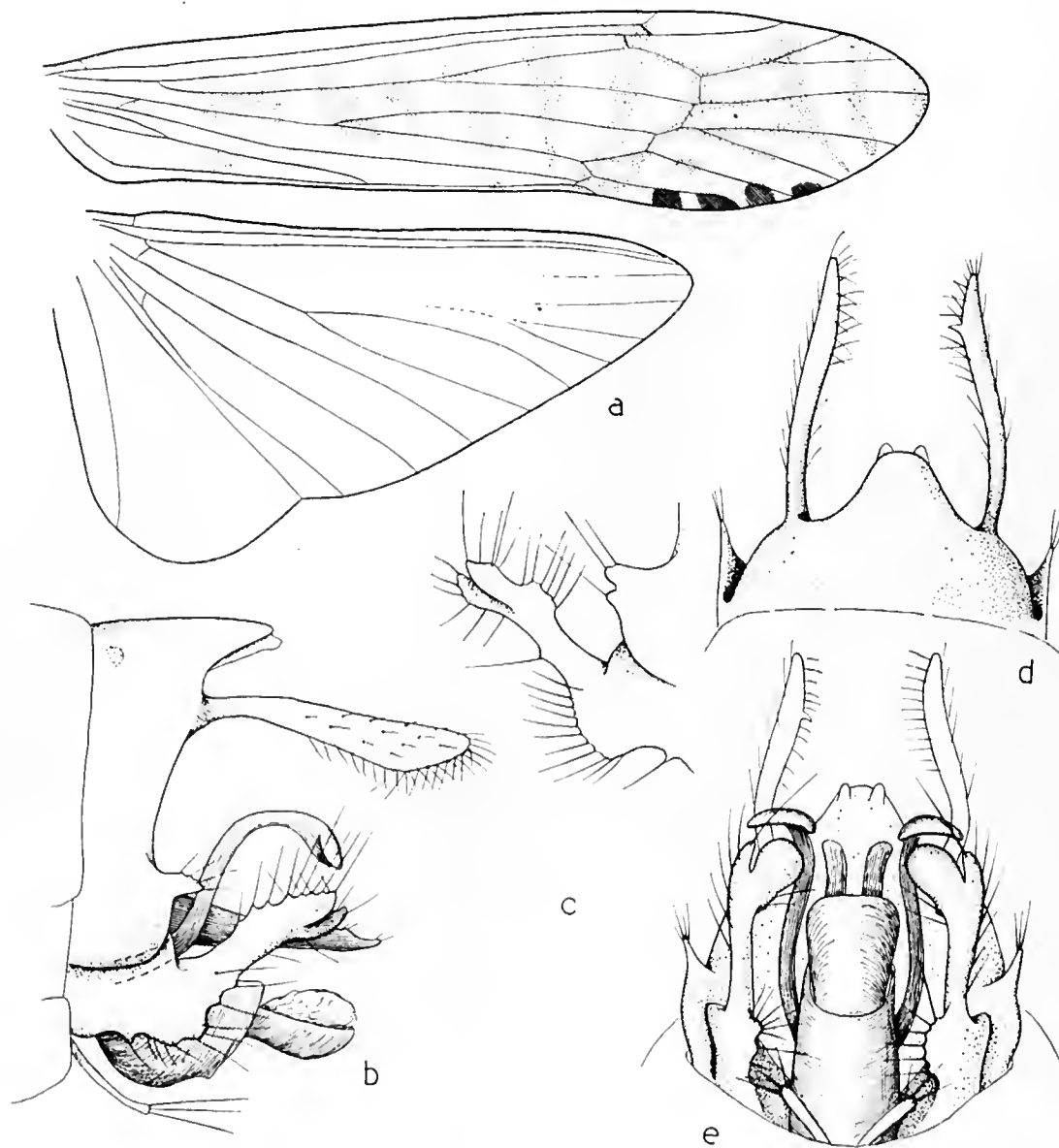


FIG. 31.—*Leptocella exquisita* Walk. ♂ (from a specimen presented by Mr. N. Banks):
 a, wings; b, genitalia, lateral; c, opposite inferior appendage and side-piece of the
 9th segment; d, 9th tergite with superior appendages; e, genitalia, ventral.

The figures and descriptions of the genitalia in both sexes have been drawn from examples furnished by Messrs. Nathan Banks and C. Betten. The shape of the wings and slight differences in neuration from the Walker female type have induced us to figure the wings of the Banks female example as well

as its genitalia, and we have also figured the wings of the male from the Banks example.

Milne includes *exquisita* among the thirteen specific names which he sinks as synonyms of *albida* Walker. We are, however, of opinion that *exquisita* is distinct, and we accordingly list it separately. The most striking difference, aside from that of colour, is perhaps in the width of the inferior appendages of the males at base.

Oecetis inconspicua (Walker).

(Fig. 32.)

- 1852. *Leptocerus inconspicuus* Walker, *partim*, Cat. Neur. Brit. Mus. : 71.
- 1861. *Setodes flavcolata* Hagen, Syn. Neur. N. Amer. : 282.
- 1861. *Setodes micans* Hagen, Syn. Neur. N. Amer. : 283.
- 1861. *Setodes sagitta* Hagen, Syn. Neur. N. Amer. : 284.
- 1864. *Sctodes flavcolata* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 882.
- 1864. *Setodes incerta* Hagen, *nec* Walker, Verh. Zool. Bot. Ges. Wien, 14 : 882, 883 (by error *micans* is identified with *Leptocerus incertus* Walker).
- 1864. *Setodes sagitta* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 883.
- 1877. *Setodes incerta* Provancher, *nec* Walker, Le Nat. Can., 9 : 265.
- 1878. *Sctodes incerta* Provancher, *nec* Walker, Petite Faun. Ent. Can., 2 : 140.
- 1892. *Setodes flavcolata*, *incerta*, *sagitta* Banks, Trans. Amer. Ent. Soc., 19 : 366.
- 1894. *Setodes incerta* Banks, *nec* Walker, Ent. News, 5 : 180.
- 1899. *Leptocerus flavcolatus*, Banks, Trans. Amer. Ent. Soc., 25 : 214.
- 1899. *Oecetina incerta* Banks, *nec* Walker, Trans. Amer. Ent. Soc., 25 : 215.
- 1899. *Oecetina parvula* Banks, Trans. Amer. Ent. Soc., 25 : 215.
- 1899. *Oecetina flavida* Banks, Trans. Amer. Ent. Soc., 25 : 216.
- 1899. *Oecetina floridana* Banks, Trans. Amer. Ent. Soc., 25 : 216.
- 1907. *Leptocerus flavcolatus* Ulmer, Genera Insect., fasc. 60a : 136.
- 1907. *Oecetis flavida*, *floridana*, *incerta*, *parvula* Ulmer, Genera Insect., fasc. 60a : 144.
- 1907. *Setodes sagitta* Ulmer, Genera Insect., fasc. 60a : 146.
- 1907. *Oecetina inornata* Banks, Proc. Ent. Soc. Wash., 8 : 128.
- 1907. *Oecetina apicalis* Banks, Proc. Ent. Soc. Wash., 8 : 129.
- 1907. *Oecetina apicalis*, *flavcolata*, *flavida*, *floridana*, *incerta*, *inornata*, *parvula*, *sagitta* Banks, Cat. Neur. Ins. U.S. : 46.
- 1926. *Oecetis incerta* Sibley, *nec* Walker, Bull. Lloyd Library, No. 27, Ent. Ser. 5 : 105.
- 1930. *Oecetina inconspicua* Banks, Bull. Brooklyn Ent. Soc., 25 : 129 (suggests that *micans* Hagen is synonym of *inconspicua* Walker).
- 1934. *Oecetis inconspicua* Milne, St. N. Amer. Trich., 1 : 17, 19.
- 1934. *Oecetis incerta* Betten, *nec* Walker, N.Y. State Mus. Bull., 292 : 271, pl. 34, figs. 6-11.
- 1934. *Oecetis flavcolata*, *flavida*, *floridana*, *parvula*, *sagitta* Betten, N.Y. State Mus. Bull., 292 : 269-274.
- 1935. *Oecetis inconspicua* Milne, St. N. Amer. Trich., 2 : unnumbered page of corrections (reduces *sagitta*, *flavcolata*, *parvula*, *flavida*, *inornata* and *apicalis* to synonymy).
- 1938. *Oecetis inconspicua* Ross, Psyche, 45 : 24-25 (designates the type-specimens of *flavcolata*, *flavida*, *floridana*, *micans*, *parvula* and *sagitta*, and lists these species as synonyms).

Walker describes the species as follows :

"*Ferrugineus* ; *abdomine nigricante* ; *palpis pedibusque testaceis* ; *alae cinereae, testaceo-pubescentes*.

" Ferruginous, with pale hairs : palpi testaceous, slightly hairy : antennae about thrice the length of the body, testaceous at the base : abdomen blackish : legs testaceous : wings slightly gray, covered with testaceous down ; veins pale. Length of the body $2\frac{1}{2}$ lines ; of the wing 9-11 lines.

" *a-c.* Georgia. From Mr. Abbot's collection."

To this we add :

Head and *thorax* yellowish brown, the *abdomen* somewhat darker ; head

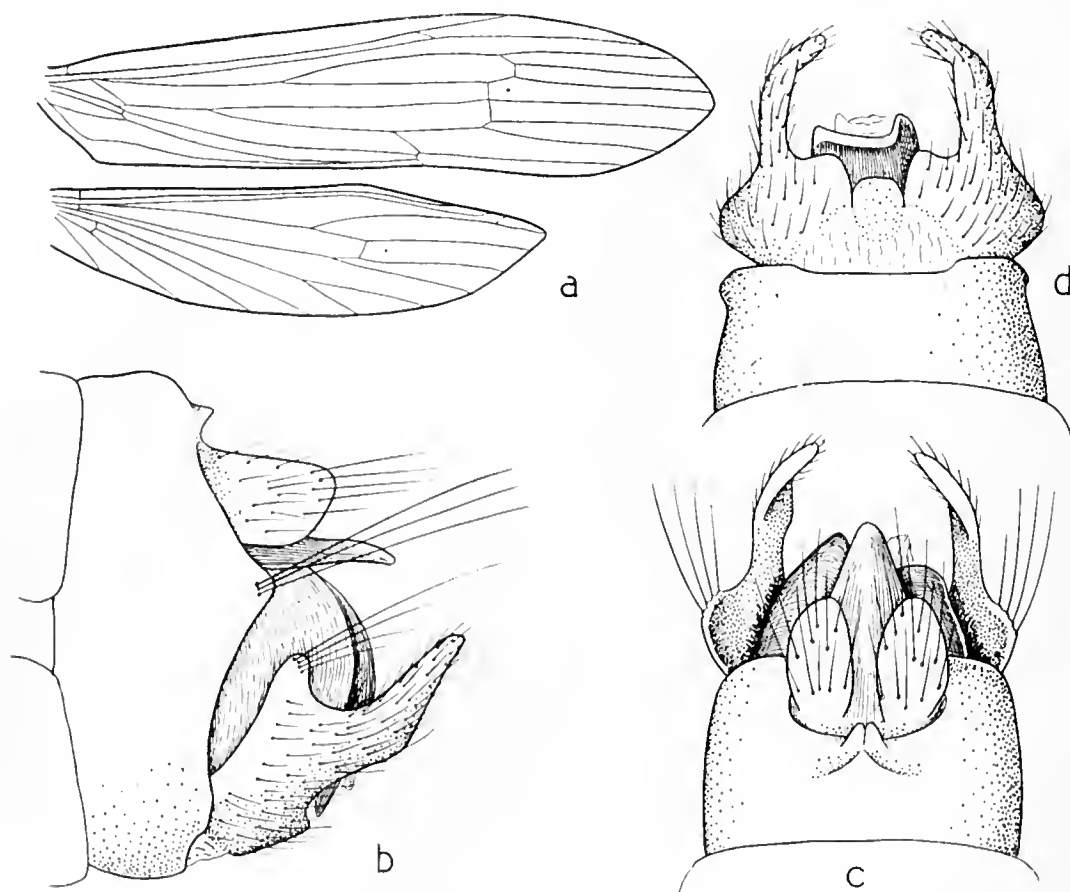


FIG. 32.—*Oecetis inconspicua* Walk. ♂ : *a*, wings ; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

covered with long, yellow hair, darker on the face ; *antennae* pale, with very narrow, dark annulations on the more basal joints ; palpi densely clothed with yellow hair ; *legs* pale, covered with short, yellow hair ; spurs 1-2-2 ; *wings* brownish, the membrane with green and bronze reflections, covered with brown hairs which are to some extent ranked upon the veins, a heavy fringe around the *fore wing* except at the posterior inner margin and around the *hind wing* beyond the costal hooks, very long on the posterior margin.

Length of the fore wing, 9 mm.

Genitalia, male.—Apical margin of the 9th tergite with a semi-circular excision, at the base of which is a pair of small projections side by side, perhaps fused ; further back towards the base is a small pointed projection ; superior

appendages large, oval, broad from the side, set in the excision of the 9th tergite, rather close together and lying side by side; beneath them is a large upper penis-cover, conical from above and appearing as a narrow plate from the side; the parts of the penis are much involved; there is an enormous, rounded and asymmetric structure from which the apex of the penis emerges as an overlapping lip, represented by the two small, angular projections which are seen in the lateral figure of the genitalia; inferior appendages broad at the base; from the side, the upper margin is strongly produced about midway, after which it leads in a concave sweep to a slender, finger-like apex; there is an excision on the lower margin opposite this projection; from beneath the bases of the appendages are dilated on their outer and sharply excised on their inner margins, the apices slender and directed inwards; from beneath, at the base of the appendages and between them is a round structure which is joined to the inner margins of both appendages; below this structure the integument is transparent and unpigmented.

Walker had before him in making his description of *inconspicuus*, three specimens, one a *Molanna*, one an *Oecetis*; the third, which McLachlan states was a *Hydropsychid*, has not been found in the collection.

Both Hagen and McLachlan assumed that Walker's description referred to the *Molanna*, and McLachlan surmised that the Leptocerid specimen might be the same as *Leptocerus ignitus* Walker. On the basis of this authority the species was for many years listed as *Molanna inconspicua*, but, in 1930, Banks suggested that the *Oecetis* should be taken as the type rather than the *Molanna*, and we concur in this opinion for the reason that Walker's phrase, "antennae thrice the length of the body", can refer only to the *Oecetis* specimen. This type-specimen is a male.

The matter of arriving at the correct name for this species has been further complicated because Hagen stated that his *Setodes micans*, which is really *Oecetis inconspicua*, is a synonym of *Leptocerus incertus* Walker. As a result, this very common North American species, *Oecetis inconspicua*, has for many years been incorrectly known as *Oecetis incerta*.

The *Molanna*, formerly regarded as the type of *inconspicua*, is identified as *Molanna tryphena* Betten.

Setodes incerta (Walker).

(Fig. 33.)

- 1852. *Leptocerus incertus* Walker, Cat. Neur. Brit. Mus. : 71.
- 1861. *Leptocerus incertus* Hagen, Syn. Neur. N. Amer. : 278.
- 1863. *Setodes incerta* McLachlan, Ent. Ann. : 158, 163.
- 1864. *Setodes incerta* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 882, 883 (by error indicates that *micans* Hagen is a synonym).
- 1907. *Setodes vernalis* Banks, Proc. Ent. Soc. Wash., 8 : 127, pl. 8, fig. 3.
- 1934. *Leptocerus incertus* Milne, St. N. Amer. Trich., 1 : 19 (*vernal* reduced to synonymy).
- 1934. *Setodes vernalis* Betten, N.Y. State Mus. Bull., 292 : 277, pl. 36, figs. 7-9.

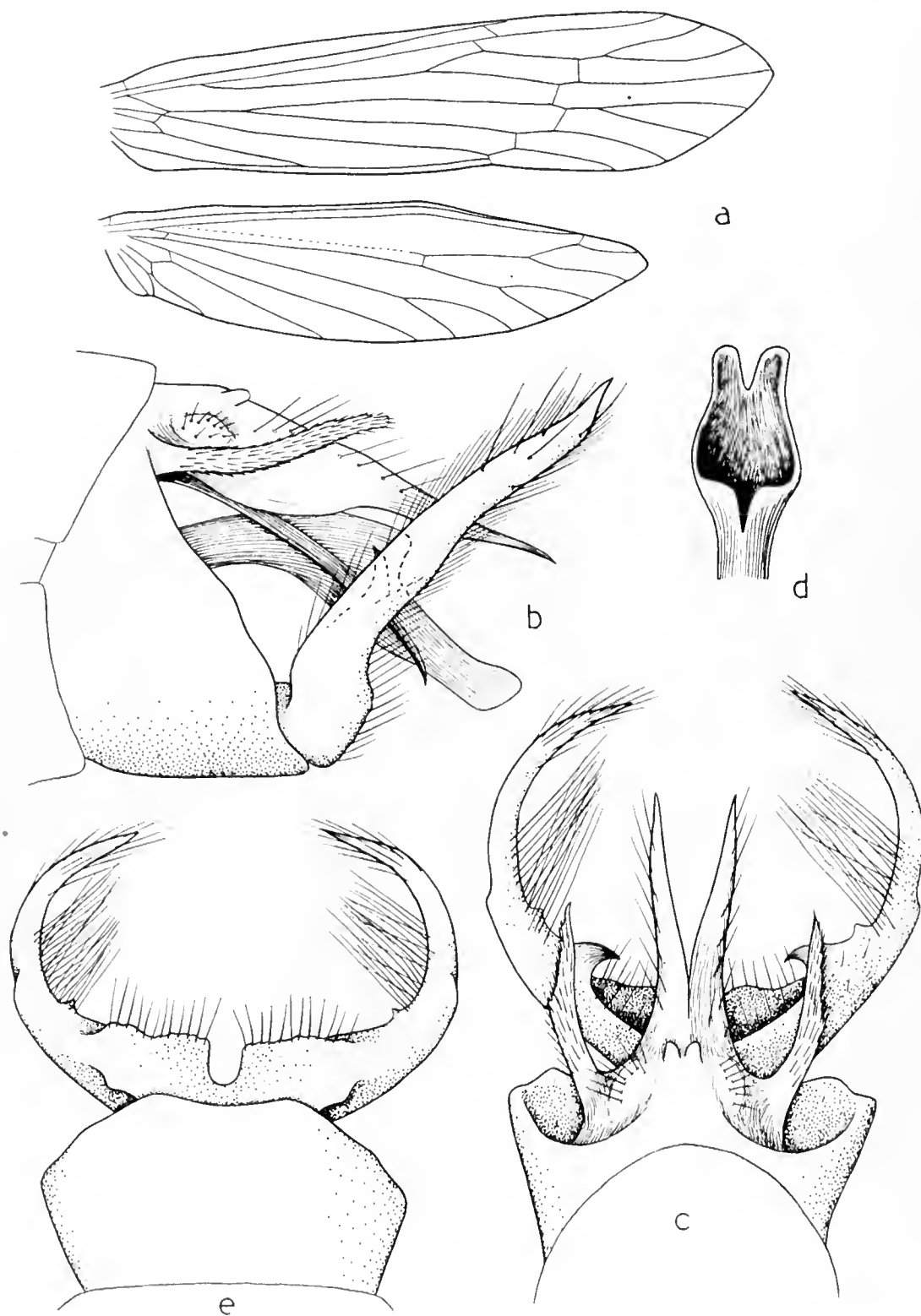


FIG. 33.—*Setodes incerta* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, penis and sheaths omitted; *d*, apex of penis, dorsal; *e*, inferior appendages and 9th sternite.

Walker describes the species as follows :

" *Obscure testaceus, aureo-pubescent, corpore subtilus antennis pedibusque albidis, abdominis apice ferrugineo ; alae cinereae, anticae aureo-pubescentes.*

" Dark testaceous, clothed with gilded down and with a few black hairs, whitish beneath : palpi hairy : antennae whitish, full thrice the length of the body : tip of the abdomen ferruginous : legs whitish : wings gray ; fore-wings covered with gilded down. Length of the body $1\frac{3}{4}$ lines ; of the wings $5\frac{1}{2}$ lines.

" *a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

To this we add :

Head brown above, with some tawny hair, some black hair below the antennae at the margins of the eyes ; basal joint of the *antenna* pale, with black hair beneath, the succeeding joints pale with the divisions hardly discernible ; palpi yellow, with darker hair ; *mesothorax* brown, with some tawny hair in the middle ; *legs* yellow ; *wings*, so far as they can be seen, brown, with brown and some pale hair.

Length of the fore wing, male, 6 mm.

Genitalia, male.—Apical margin of the 9th tergite produced in a large plate bifurcate almost to the base, forks nearly parallel, diverging towards their apices, which are very acute ; from the side, the lower margin much dilated ; at the base, on the dorsal surface, is a pair of small, rounded lobes, side by side ; superior appendages which are set with minute saw-like ridges, rather short and narrow, about half the length of the dorsal plate ; penis arching downward, bifurcate, the upper lateral margins elevated considerably about midway, forming a deep scoop ; inferior appendages heavily fringed along the inner margins, caliper-shaped with acute apices and with an acute spur on an inner ridge towards the base ; this spur is claw-shaped and stout from above ; the bases of the appendages at their attachment to the segment are slightly produced in narrow ridges.

The single type-specimen was glued to its support by the wings so that these could not be seen well ; microscope preparations have now been made of the specimen and the venation figured.

The mistaken transfer of the specific name of this species to *Oecetis inconspicua* has been explained in connection with the description of that species.

***Mystacides sepulchralis* (Walker).**

(Fig. 34.)

Psychomyia sepulchralis Barnston (MSS.).

1852. *Leptocerus sepulchralis* Walker, Cat. Neur. Brit. Mus. : 70.

1861. *Leptocerus sepulchralis* Hagen, Syn. Neur. N. Amer. : 277.

1863. *Leptocerus sepulchralis* McLachlan, Ent. Ann. : 158.

1864. *Leptocerus sepulchralis* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 831 (listed as synonym of *atra* Pict.).

1877. *Mystacides sepulchralis* McLachlan, Rev. and Syn. Trich. : 314.

1877. *Leptocerus nigra* Provancher, Le Nat. Can., 9 : 264.
 1878. *Leptocerus nigra* Provancher, Petite Faun. Ent. Can., 2 : 139.
 1892. *Mystacides atra* Banks, Trans. Amer. Ent. Soc., 19 : 366.
 1892. *Mystacides sepulchralis* Banks, Trans. Amer. Ent. Soc., 19 : 366.
 1899. *Mystacides nigra* Banks, Trans. Amer. Ent. Soc., 25 : 214.
 1906. *Mystacides sepulchralis* Ulmer, Notes Leyd. Mus., 28 : 39, figs. 47-49.
 1907. *Mystacides sepulchralis* Ulmer, Genera Insect., fasc. 60a : 140, pl. 18, fig. 162b, c.
 1907. *Mystacides nigra* Banks, Cat. Neur. Ins. U.S. : 46.
 1907. *Mystacides sepulchralis* Banks, Cat. Neur. Ins. U.S. : 46.
 1926. *Mystacides sepulchralis* Sibley, Bull. Lloyd Lib., no. 27, Ent. Ser., 5 : 105.
 1934. *Mystacides sepulchralis* Betten, N.Y. State Mus. Bull., 292 : 281, pl. 37, figs. 7-10 ; pl. 38, figs. 1-13.
 1936. *Mystacides sepulchralis* Milne, St. N. Amer. Trich., 1 : 19.

Walker describes the species as follows :

"*Niger* ; *antennae albo annulatae* ; *abdomen apice ferrugineum* ; *pedes testacei* ; *alae nigricantes*.

"*L. niger* var. ?

"Black, clothed with black hairs : antennae more than twice the length of the body, with a white ring on each joint, wholly black towards the tips : abdomen ferruginous at the tip : legs testaceous : wings blackish, deeply fringed. Length of the body $2\frac{1}{2}$ lines ; of the wings 6 lines.

"*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

We add :

Head, palpi and *thorax* black, the palpi covered with black hairs ; *antennae* with basal joint dark brown, the succeeding joints with dark brown and narrower pale annulations ; fore and hind *legs* brown, the middle legs with pale pubescence, against which some dark spines stand out ; the tarsal joints have pale areas at base ; *wings* very dark brown or black, shining, covered with black hairs, the apical fringe somewhat lighter.

Length of the fore wing, male, 9 mm.

Genitalia, male.—Apical margin of the 9th tergite slightly produced at its centre and excised ; superior appendages slender and finger-shaped ; they appear to arise from the margin of the 9th tergite ; the upper penis-cover (of MacLachlan), or perhaps a dorsal plate, broad at the base, terminating in three asymmetric, twisted spines of which, in the type, an outer spine is shorter than the other two and passes between them ; penis arching downward with a very small upper penis-cover, seen from the side, as an upwardly-slanting plate ; lower penis-cover forming an arching trough in which lies the penis, which appears as a pair of spine-like plates ; inferior appendages, from the side, broad, outer margin serrate ; from behind they are seen to be furcate, the two forks rounded, and divided from each other by a narrow excision, inner margins from beneath, widely serrate ; the centre of the margin of the 9th sternite produced in a bifurcate process, the forks long and divergent, apices somewhat dilated as seen from the side.

There are now four specimens in the collection, one, a female, bearing the name "*Psychomyia sepulchralis*" in Barnston's handwriting, two others, male and

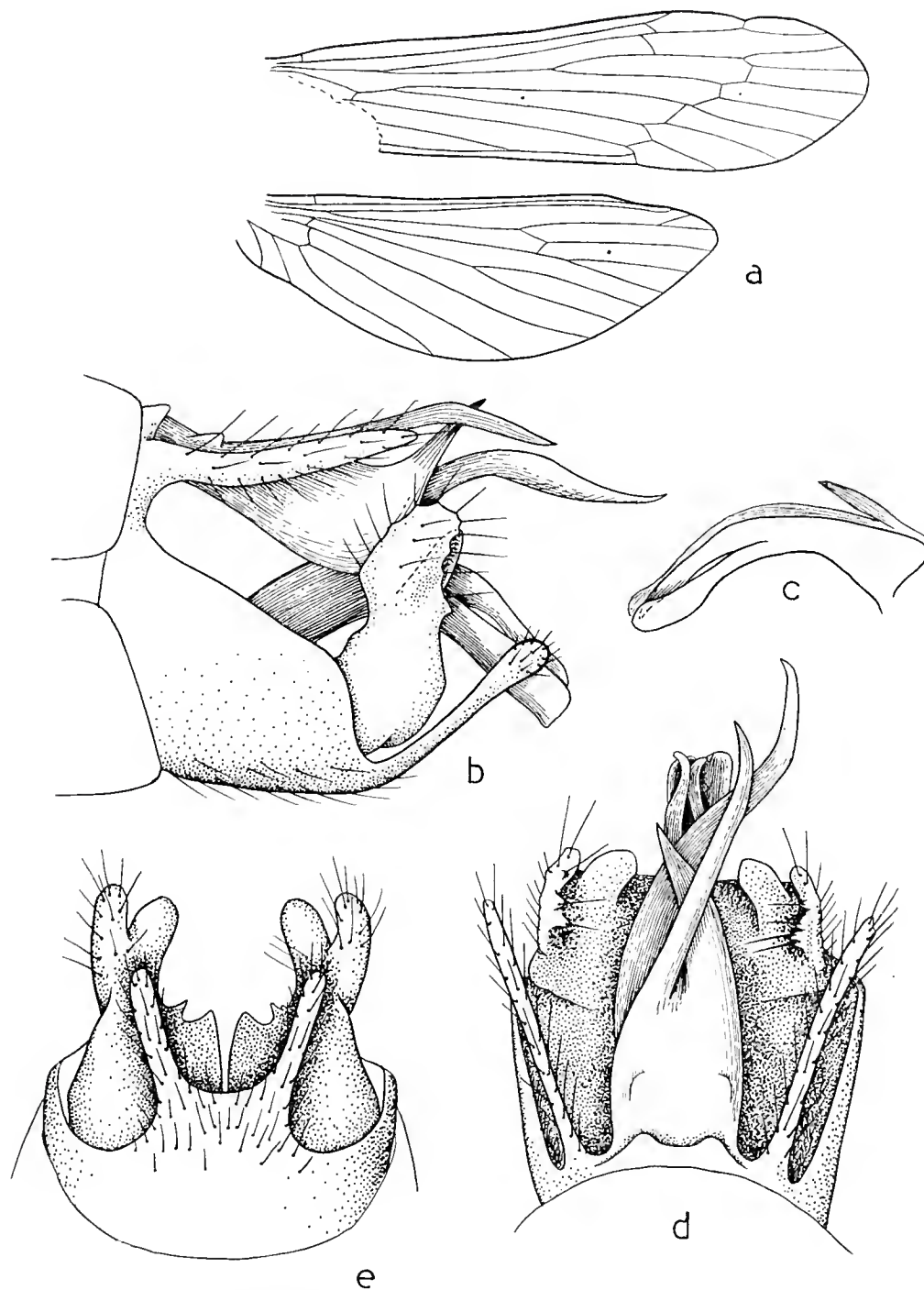


FIG. 34.—*Mystacides sepulchralis* Walk. ♂: *a*, wings; *b*, genitalia, lateral; *c*, penis and sheaths, from another example; *d*, genitalia, dorsal, margin of 9th sternite omitted; *e*, margin of 9th sternite and inferior appendages.

female, labelled "Hudson's Bay" in Walker's handwriting, and a fourth, without abdomen, collected at the St. Lawrence River, by E. Doubleday. We assume that the first three were seen by Walker.

We designate as the type the male from Hudson's Bay, in preference to the specimen bearing Barnston's label, inasmuch as the latter bears no locality

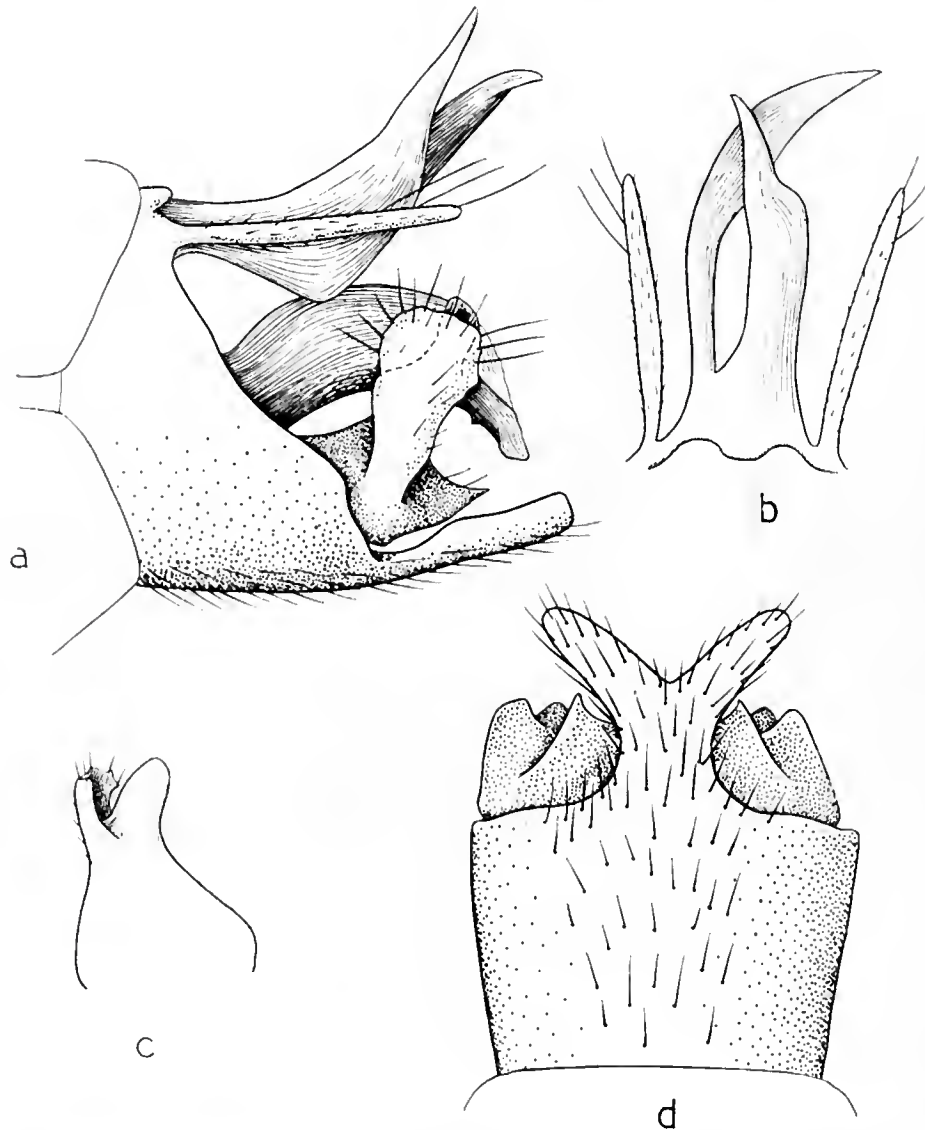


FIG. 35.—*Mystacides azurea* L. ♂: *a*, genitalia, lateral; *b*, dorsal plate and superior appendages; *c*, an inferior appendage, from behind; *d*, margin of 9th sternite and inferior appendages, from beneath.

label and no Museum registration number. There is no reason to doubt that all four are of the same species.

Walker questions whether this species may not be a variety of Pictet's *niger*, which is equivalent to *azurea* L., and McLachlan (1877) remarks upon this strong relationship. We therefore include figures of the genitalia of the European *azurea* for comparison (Fig. 35).

The species has also been listed under the name of the European *nigra* L. (or its synonym *atra* Pict.) ; to this species it bears little resemblance.

Martynov (1910, *Ann. Zool. Ac. Imp. Sci. St. Peters.*, **15** : 376) recorded this species from Siberia, but later (1924, *Jahrb. Martjan. Staatsmus. Minoussinsk*, **2**, no. 3 : 92) he described a new species, *M. bifida*, to which he assigned his material, and he informed us, after examination of American material sent to him, that he regarded *bifida* and *sepulchralis* as distinct.

***Triaenodella ignita* (Walker).**

(Fig. 36.)

- 1852. *Leptocerus ignitus* Walker, *partim*, Cat. Neur. Brit. Mus. : 72.
- 1861. *Setodes ignita* Hagen, *partim*, Syn. Neur. N. Amer. : 281.
- 1863. *Setodes ignita* McLachlan, *partim*, Ent. Ann. : 163.
- 1864. *Setodes ignita* Hagen, *partim*, Verh. Zool. Bot. Ges. Wien, **14** : 882.
- 1892. *Setodes ignita* Banks, *partim*, Trans. Amer. Ent. Soc., **19** : 366.
- 1900. *Triaenodes ignita* Banks, *partim*, Trans. Amer. Ent. Soc., **26** : 258.
- 1907. *Triaenodes ignita* Ulmer, *partim*, Genera Insect., fasc. **60a** : 141.
- 1907. *Triaenodes ignita* Banks, *partim*, Cat. Neur. Ins. U.S. : 45.

Walker describes the species as follows :

“*Testaceus ; antennae albidæ fulvo annulatae ; pedes albidī ; alae albidæ, iridescentes, anticae testaceo-pilosae ; maculis duabus posticis nigris.*”

“Testaceous : palpi slightly hairy : antennae whitish, more than four times the length of the body, with a tawny ring on each joint : legs whitish : wings whitish, iridescent, deeply fringed ; fore-wings clothed with testaceous hairs, and having two black spots in the hind border. Length of the body $2\frac{1}{4}$ lines ; of the wings 8 lines.

“*a, b. Georgia. From Mr. Abbot's collection.*”

We add :

Head yellow above, with sparse yellow hair ; in front also a covering of yellow hair with some black hair along the margins of the eyes ; *antennae* (broken) with large basal joints covered with yellow hair, with a scale or small flap, concealing a pencil of hairs (a character distinguishing *Triaenodella* from *Triaenodes*) ; the next succeeding joints slender, narrowly ringed with brown ; palpi heavily covered with long yellow and a few dark hairs, the 2nd joint somewhat longer than the 1st, the 3rd about equal to the 2nd, the 4th shortest and the 5th the longest ; *thorax* yellowish brown ; *legs* (only the fore legs and a part of one hind leg remain) yellow, the hind femora with whitish hair ; *fore wings* covered with brownish and with some white and some black hair in no well-marked pattern, a series of dark brown patches along the apical margin and extending into the fringe, the black hair limited to a small part of the costal margin near the body, and to two conspicuous spots near the posterior margin, one at roughly one-third and the other at two-thirds of the wing-length from the base ; the right wing is partly denuded, but shows one of these spots and the dark apex and apical fringe ; the *hind wings* are transparent, with

green and purple reflections, and are covered sparsely with yellowish and some darker hair, and have long, yellowish fringes on the posterior margins.

Length of the fore wing, male, 8 mm.

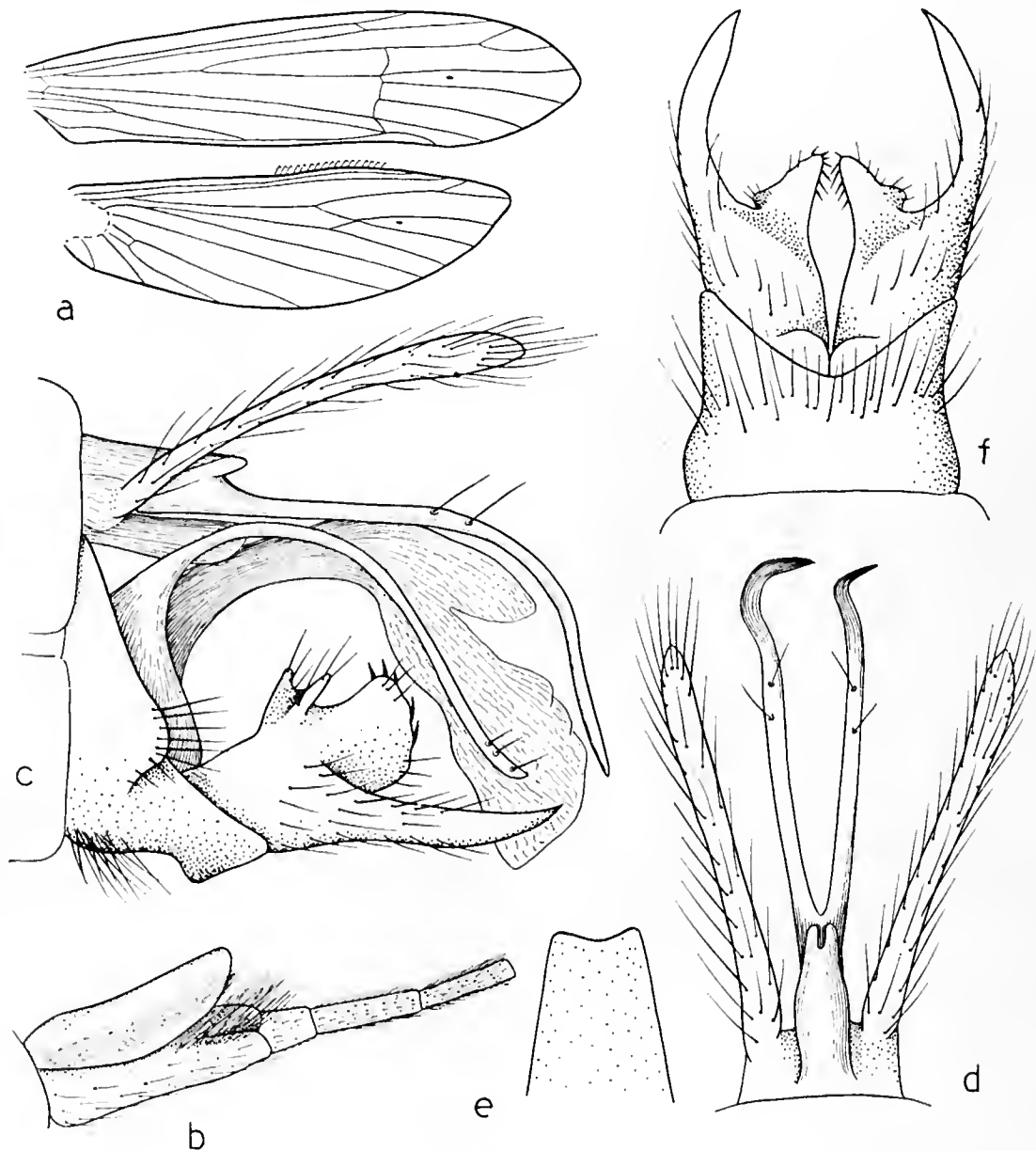


FIG. 36.—*Tricnospila ignita* Walk. ♂: *a*, wings; *b*, basal joints of the antenna; *c*, genitalia, lateral; *d*, dorsal plate, superior appendages, etc.; *e*, upper penis-cover, dorsal; *f*, inferior appendages and 9th sternite.

Genitalia, male.—Apical margin of the 9th tergite produced in a pair of long spines, their apices both directed to one side as if bent; each of these spines bears a pair of hairs, one behind the other, on its dorsal surface about midway; between and above them is a small process with a bifurcate apex; superior appendages long, narrow and heavily fringed; there is a very short

upper penis-cover concealed under the dorsal plate with a truncate or concave apical margin; penis arching downward, dilated at its membranous apex, which is divided, one part superimposed above the other; there is a pair of spine-like, arching penis-sheaths, each with three hairs in a row at its apex; inferior appendages branched, broad at the base, outer branch long and slender, directed distally, apex acute; all the other branches arise from the dilated upper and inner margins; from the side, the most distal of these branches is very short and broad, bearing a mass of strong teeth on its inner surface; near the base and arising from the upper margin is, on the outside, a small, finger-like branch, and on the inside, a plate with a widely serrate upper margin; from beneath the appendages are caliper-shaped, with strong angular projections of their inner margins at their bases; the margin of the 9th sternite, which is heavily fringed, is widely excised and with produced triangular apical angles.

Of the two specimens referred to by Walker, we designate as the type the one that agrees with the original description in having two black spots on the hind border of the fore wing. The other specimen is described below as a new species, *Triaenodella ochracea*.

We have included in the bibliography of this species only the references that are merely listings from Walker's catalogue, since it appears certain that the later descriptions and figures refer to other species than Walker's *ignita*. This appears to be true of the species described and figured by Ulmer (1907, *Cat. Coll. Selys*, 6 (1): 47, figs. 72-75). The five species described and figured by Betten (1934, *N.Y. State Mus. Bull.*, 292: 283-287, pl. 39) have been re-examined, and none of them agrees with Walker's type; thus the species described there as *ignita* Walker will require renaming.

It seems likely that Milne's species *Triaenodes mephita* (*ignita*, 1934, *St. N. Amer. Trich.*, 1: 12, changed to *mephita*, 1936, *op. cit.*, 3: 58-59) may be *ignita* Walker, but in the absence of figures it is not possible to be certain.

***Triaenodella ochracea* sp. n.**

(Fig. 37.)

1852. *Leptocerus ignitus* Walker, *partim*, *Cat. Neur. Brit. Mus.*: 72.

Walker describes the species as follows:

"*Testaceus*; *antennae albidae fulvo annulatae*; *pedes albid*i; *alae albidae, iridescentes, anticae testaceo-pilosae, maculis duabus posticis nigris*."

"Testaceous: palpi slightly hairy: antennae whitish, more than four times the length of the body, with a tawny ring on each joint: legs whitish: wings whitish, iridescent, deeply fringed; fore-wings clothed with testaceous hairs, and having two black spots in the hind border. Length of the body $2\frac{1}{2}$ lines; of the wings 8 lines."

"*a, b. Georgia. From Mr. Abbot's collection.*"

To this we add:

Head yellow above, with long, whitish hair; pale hair also below the

antennae; some darker hair along the inner eye margins; *antennae* clothed throughout with short, white pubescence, the joints scarcely discernible; a

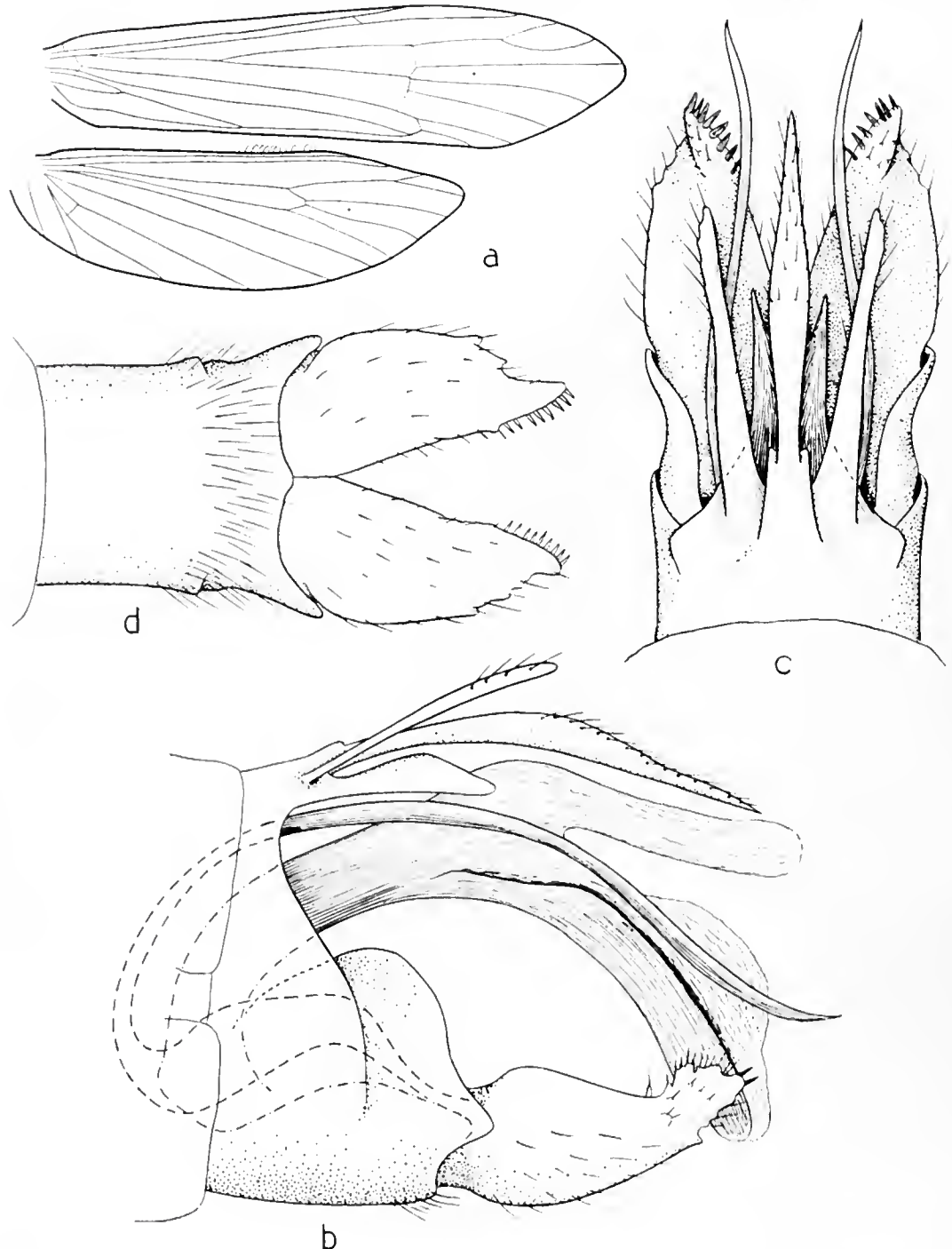


FIG. 37.—*Triaenodella ochracea* sp. n. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, penis omitted; *d*, inferior appendages and 9th sternite.

flap or scale, concealing a pencil of hairs, on the basal joint; palpi with long, yellow hair, the 2nd joint a little longer than the 1st, the 3rd about equal to the 2nd, the 4th shortest, the 5th longest; *thorax* yellow, with whitish hair;

legs pale yellow, the hind pair whitish, middle and hind pair with dark spines ; *fore wing* (but one present) somewhat denuded at the base, covered with yellow hair and having a bright yellow fringe ; *hind wings* transparent, with long, pale fringe, very long near the body ; *abdomen* pale yellow, the lateral stripe also pale, with its upper and lower margins darker.

Length of the fore wing, male, 9 mm.

Genitalia, male.—The apical margin of the 9th tergite is produced at its centre in a long, slightly down-curving, narrow plate, dilated at its centre along its upper margin and fringed ; seen from above there are small shoulders at the base, and it terminates in an acute apex ; on each side is a short and very slender superior appendage, fringed with long hairs along the upper surface towards the apex ; beneath the dorsal plate is an upper penis-cover with a bifurcate apex ; the penis itself is bifurcate from about midway, with the forks membranous and superimposed ; there is a pair of spine-like sheaths about the same length as the penis itself ; lower penis-cover membranous and of uncertain shape ; inferior appendages possibly two-jointed but, if so, the basal joint is partly fused to the 9th segment ; they are very broad at the base and terminate in unusually serrate apices, which bear on their inner surfaces stout, peg-like teeth.

The type of this species is the second of the specimens mentioned by Walker under the name "*Leptocerus ignitus*" ; it is clearly distinct from the specimen selected as the type of *ignitus*, particularly in lacking the two black dots on the fore wing. Apart from this character, the pattern of the genitalia would alone suffice to separate the species.

Ochracea, like *ignita*, agrees with none of the northern species described and figured by Betten (1934).

Milne surmised that this, the second of Walker's examples of his *ignita*, is the same as *Triaenodes aba* Milne (1934, *St. N. Amer. Trich.*, 1 : 12 ; and *op. cit.*, 1935, 2 : 20) ; we judge it much more likely that it will prove to be *Triaenodes helo* Milne (1934). We describe the specimen as the type of a new species rather than assume it to be one or the other of Milne's species, of which we have no examples for comparison.

PHRYGANEIDAE.

Phryganea cinerea (Walker).

(Figs. 38, 39.)

Phryganea cinerea Barnston, MSS.

1852. *Phryganea cinerea* Walker, Cat. Neur. Brit. Mus. : 4.

1861. *Phryganea cinerea* Hagen, Syn. Neur. N. Amer. : 252.

1863. *Phryganea cinerea* McLachlan, Ent. Ann. : 156, 161.

1864. *Phryganea cinerea* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 859.

1873. *Phryganea cinerea* Hagen, Verh. Zool. Bot. Ges. Wien, 23 : 410.

1873. *Phryganea cinerea* Hagen, Proc. Bost. Soc. Nat. Hist., 15 : 385.

1877. *Phryganea cinerea* Provancher, Le Nat. Can., 9 : 215.

1878. *Phryganea cinerea* Provancher, Petite Faun. Ent. Can., 2 : 127.
 1892. *Phryganea cinerea* Banks, Trans. Amer. Ent. Soc., 19 : 362.
 1907. *Phryganea cinerea* Ulmer, Genera Insect., fasc. 60a : 25.
 1907. *Phryganea cinerea* Banks, Cat. Neur. Ins. U.S. : 35.
 1924. *Neophryganea cinerea* Martynov, Ann. Mag. Nat. Hist., (9) 14 : 213.
 1934. *Neophryganea cinerea* Milne, St. N. Amer. Trich., 1 : 4, 8.
 1934. *Phryganea cinerea* Betten, N.Y. State Mus. Bull., 292 : 291, pl. 40, figs. 1, 2.

Walker describes the species as follows :

"*Testacea, supra cinereo vittata ; alae anticae fuscae, pubescentes, cinereo confertim guttatae ; alae posticae fusco-cinereae.*

"Testaceous, with a broad gray dorsal stripe extending from the head to the tip of the abdomen : tips of anterior tibiae and of the joints of the anterior tarsi black : fore-wings brown, downy, thickly covered with gray dots ; the posterior or cubital anastomosis and the form of the adjoining subapical areolets vary according to the sex as in other species ; hind-wings brownish. Length of the body 7-8 lines ; of the wings 22-26 lines.

"*a, b.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

Added description and notes :

Head brown above with yellow bordering the eyes, and with two longitudinal stripes of white hair with a pale line between them ; white hair also at the posterior angles ; in front, the head is covered with black and with a few white hairs ; ocelli yellow, margined with black, very prominent ; *antennae* with broad brown and narrower pale annulations, a black chitinous ring in each joint ; palpi brown, clothed with short, black hair ; pronotum with long, black and white hair ; mesonotum dark brown, with a median stripe of white hair ; *fore* and *middle legs* with the femora brown, the tibiae and tarsi paler and tipped with brown ; *hind legs* (tarsi wanting) paler than the others ; all the legs with black spines and yellow spurs ; *fore wings* brown and white, the white mostly in round dots ; some black hair also, most conspicuous on the bases of the anal veins and on Cu₁ ; indistinct black stripes in cell R₄ and cell R₅ ; small dark spots at the tips of the veins ; *hind wings* somewhat dark along the apical margin, the veins being strongly marked ; *abdomen* yellow, darker above ; the posterior margin of the 9th segment with a row of long, yellow bristles.

Walker's second specimen is a female which is considerably larger than the male type, but otherwise very similar ; compared with the type, this female has more black hair on the fore wing, particularly in cell M and in cell M₂, giving the appearance of a black, interrupted longitudinal streak extending through most of the wing as in the European species *P. striata* L. M₄ is present in the fore wing, running obliquely to join Cu₁.

Length of the fore wing, male, 22 mm. ; female, 26 mm.

Genitalia, male.—The apical margin of the 9th tergite widely excised, the base of the excision being strongly produced to make a wide process with the apical margin sparsely fringed with long hairs ; beyond the 9th tergite is a composite structure, probably composed of the fused superior appendages ;

from above, the upper part of this structure is widely excised, the base of the excision flattened; from the side the upper part is divided from the lower by a narrow excision; from this aspect the lower part is produced beyond the

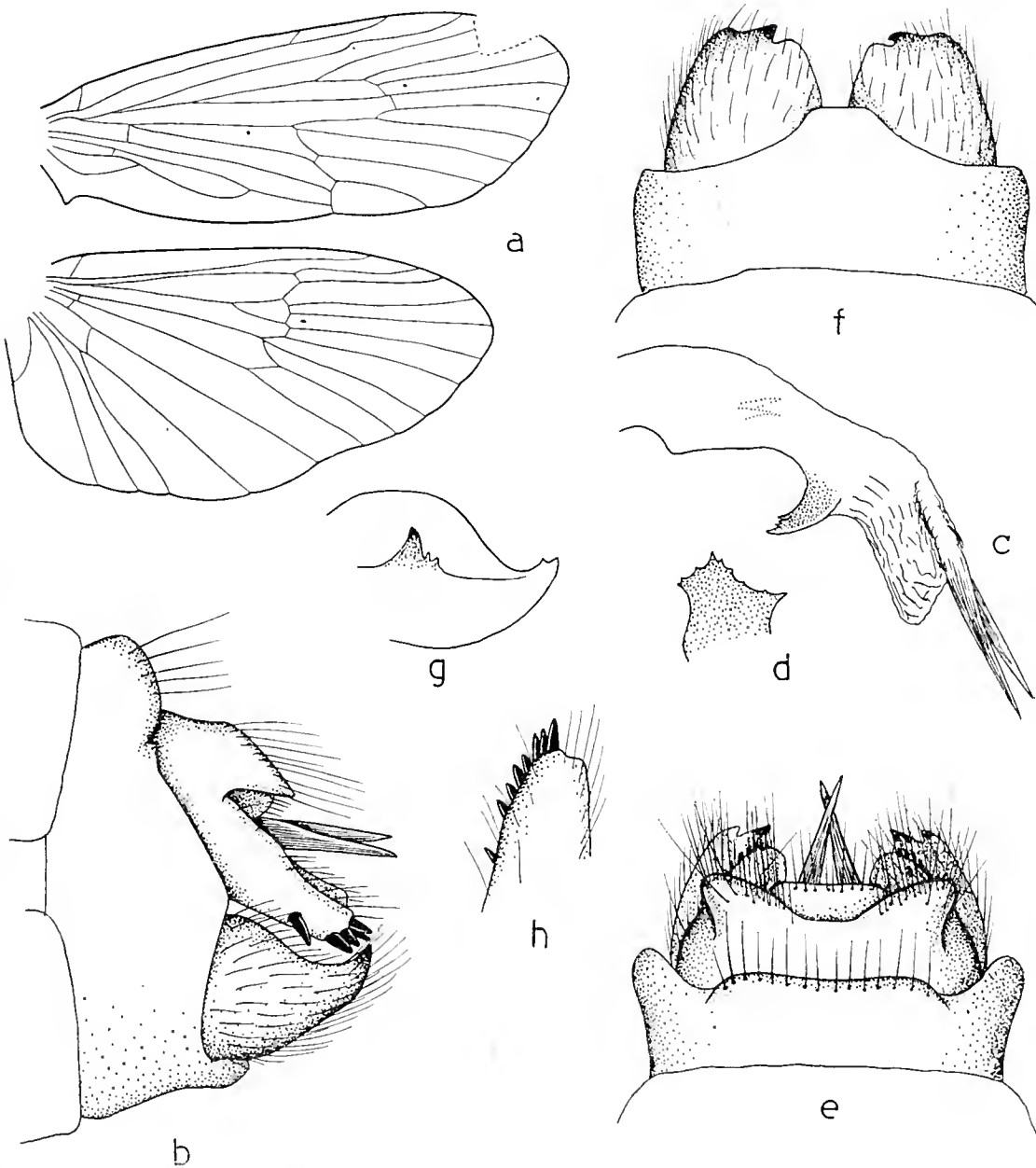


FIG. 38.—*Phryganea cinerea* Walk. ♂: *a*, wings; *b*, genitalia, lateral; *c*, penis, lateral; *d*, latero-ventral plate of the penis, from behind; *e*, genitalia, dorsal, *f*, ventral; *g*, inferior appendage, from within; *h*, apex of the intermediate appendage, from above.

upper, and at its apex and partly round its lower apical margin are set stout, peg-like, brown teeth; from above, the lower structure forms a pair of wide processes, the teeth extending along the outer margins nearly to the base; there is a shelf-like upper penis-cover, beneath which projects a pair of spine-like

penis-sheaths, possibly variable in length in different examples ; penis retracted, furnished on its under-surface near its base with a pair of downwardly directed, strongly-chitinized plates with serrate apical margins ; there is a pair of short spines attached to some internal tube visible in a balsam mount through the walls of the penis ; inferior appendages short and broad, apices widely and strongly dentate, each with an inner ridge near the base formed of strong

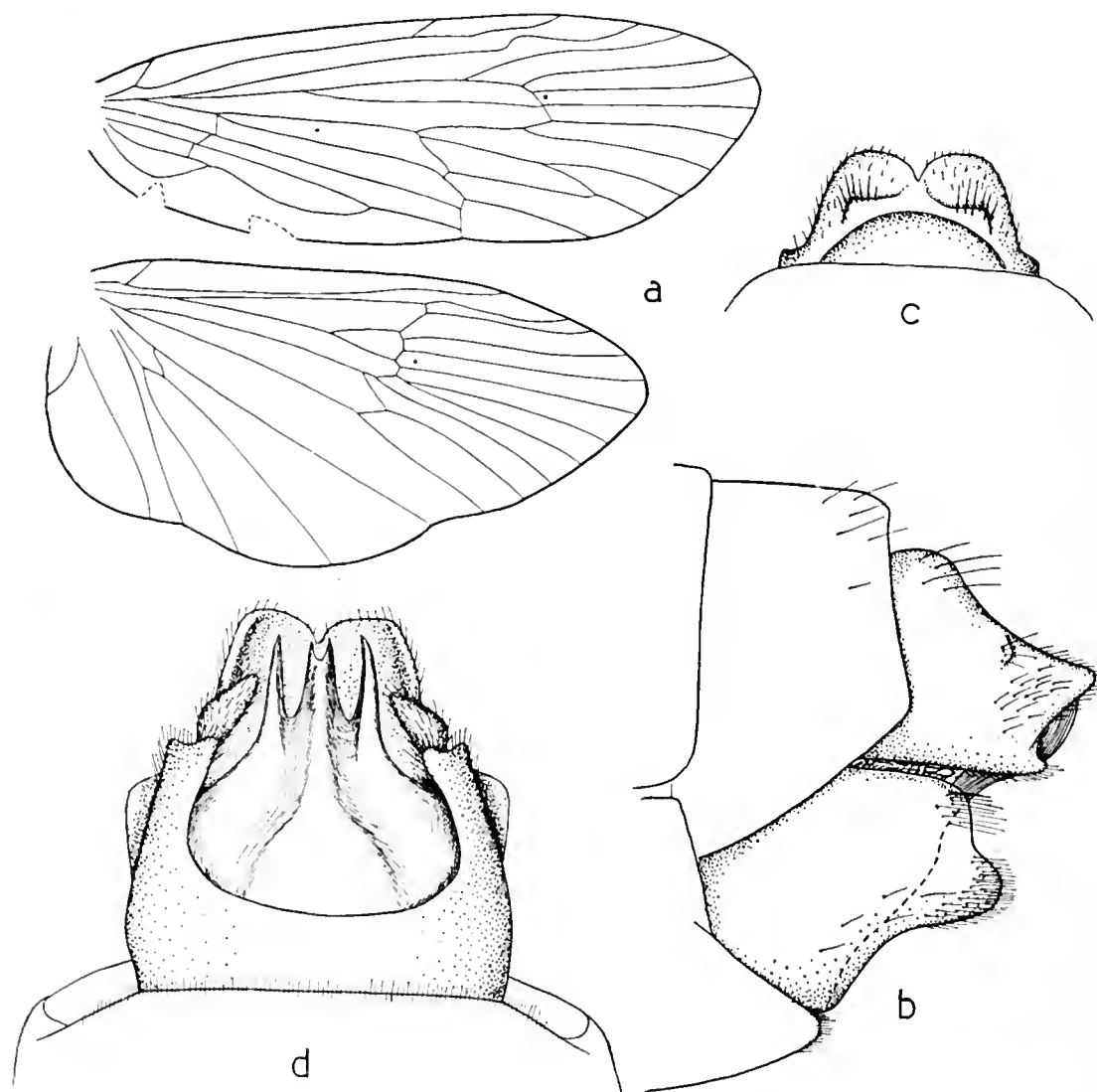


FIG. 39.—*Phryganca cinerea* Walk. ♀: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

teeth ; the centre of the apical margin of the 9th sternite is produced in a short, blunt process.

Genitalia, female.—Terminal dorsal segment produced to form a hood, the base of which is elevated in a hump with a rounded margin ; seen from above, the apical margin of the hood is excised to form two rounded lobes, at the base of each of which is a small, fringed shelf ; from the side, the hood projects in a small lower angle, which is seen from beneath to be the lower basal margin of a

narrow, spindle-shaped process directed inwards ; the hood covers a strongly-chitinized, trifurcate structure of which the outer forks are narrow and acute at the apices, the inner comparatively broad with a deeply excised apex ; the margin of the penultimate segment, from beneath, is widely excised, with the inner apical angles directed slightly inwards ; the apical margins from the side, roundly produced ; no ventral teeth.

We designate Walker's male specimen as the type and the female as the allotype. The type is in poor condition, having but one fore and one hind wing remaining.

While there is no reason to doubt that the two specimens described by Walker are of the same species, one cannot at present be very certain about the separation of the females of this and of related species. In the female of *cinerea*, described above, the wings are very broad (width to length, fore wing, 1 : 2.9, hind wing, 1 : 1.9) ; the apex is broadly rounded, and M_4 is present in the fore wing as an oblique cross-vein from M_3 to Cu_1 . Mr. Banks has kindly sent a female, identified as this species, which has the wings somewhat narrower (width to length, fore wing, 1 : 3.2, hind wing, 1.2), the apex of the fore wing more pointed, and M_4 not present. We are unable to distinguish this specimen from the allotype by the genitalia. Further, Betten (1934, pl. 40, fig. 4) has figured the wings of what he took to be the female of *P. sayi* Milne ; in this specimen the wings are narrow and M_4 is present, and the genitalia are practically identical with those of the allotype of *cinerea*. We have thus one broad-winged form with M_4 present, one narrow-winged form with M_4 present, and one narrow-winged form with M_4 absent, all much alike in coloration and in the structure of the genitalia.

The possibility that some or all of the female specimens here referred to may belong to *P. sayi* is not altogether excluded ; the interrupted black line in the fore wings of these specimens is very like that of the males of that species. A study of females absolutely associated with males is needed to clear up these difficulties.

Phryganea divulsa Walker has commonly been considered to be a synonym of *P. cinerea* ; we prefer to list it separately, though the resemblance is close.

***Phryganea divulsa* Walker.**

(Fig. 40.)

- 1860. *Phryganea divulsa* Walker, Trans. Ent. Soc. Lond., (2) 5 : 176.
- 1864. *Phryganea divulsa* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 859.
- 1866. *Phryganea divulsa* McLachlan, Trans. Ent. Soc. Lond., (3) 5 : 275.
- 1873. *Phryganea divulsa* Hagen, Verh. Zool. Bot. Ges. Wien, 23 : 411.

Walker describes the species as follows :

"*Masc. Cinerea, subtus testacea, antennis fuscis pallido-annulatis, alis anticis fusco-nebulosis, vitta abbreviata interrupta strigaeque anteriore discalibus nigris albo-notatis.*

"Male. Cinereous, testaceous beneath: antennae brown, with pale rings; fore-wings mottled with brown, with a black discal abbreviated stripe, which is interrupted in the middle, and is marked with white at the end of each of its two parts; a black discal streak in front of the exterior part of the stripe, marked with

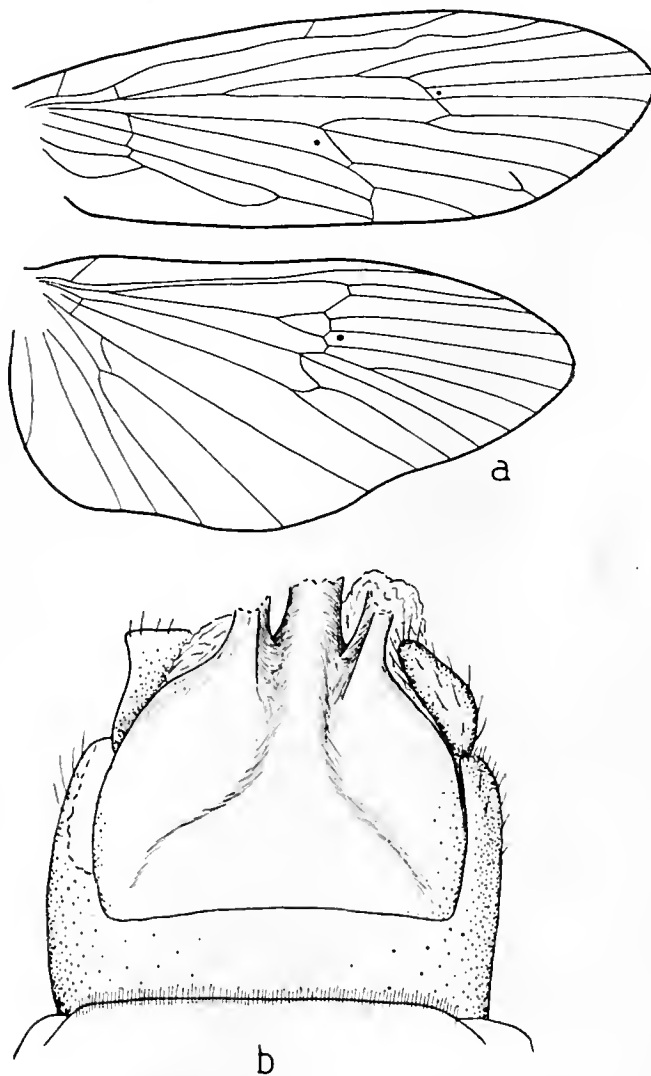


FIG. 40.—*Phryganea divulsa* Walk. ♀: *a*, wings; *b*, genitalia, ventral.

white at its inner end. The species much resembles *P. grandis*, but may be distinguished by the much mottled interior border of the fore-wings, and by the differences in the black stripe. Length of the body $7\frac{1}{2}$ lines; of the wings 19 lines. Haiti."

We add:

Head yellowish brown above with two longitudinal stripes of white hair, a clear line between these, white hair also at the posterior angles; ocelli yellow, margined with black; the front of the head with black and a few white hairs; *antennae* with broad brown and narrower pale annulations, a black ring in the chitin in each joint; palpi brown, clothed with short, black hair; pronotum

with long black and white hair ; mesonotum dark brown with white hair in the median line ; *legs* pale, with black spines and yellow spurs, the fore and middle tibiae and tarsi tipped with brown ; *fore wings* with brown and white spots and with lines of black pubescence along the anal veins and Cu ; a black stripe in the base of cell R_4 with a rather conspicuous white dot at its basal end ; another black stripe runs through cell M_1 , is broken by a white spot, is then continued through cell M_2 , and is terminated by another white spot ; M_4 appears to be present in the fore wing (female), running obliquely into Cu_1 .

Length of the fore wings, female, 21 mm.

Genitalia, female.—The apex of the abdomen has been partly destroyed, so that it is not possible to recognize the exact form of the genitalia. The parts would appear to follow closely the pattern in *cinerea*.

The type material consists of a single female specimen which has commonly been regarded as a *Phryganea cinerea*. While the types bear very close resemblance, we judge it best to list the names separately, pending the time when the Haitian males may become known. McLachlan (1866) regarded *divulsa* as "perhaps identical" with *cinerea*, and he questioned the locality from which the type is reported. The record of the occurrence of a species of *Phryganea* as far south as Haiti is, of course, somewhat surprising.

As McLachlan has noted, Walker was mistaken in regarding the type as a male.

Phryganea vestita (Walker).

(Fig. 41.)

- 1852. *Neuronina vestita* Walker, Cat. Neur. Brit. Mus. : 10.
- 1852. *Neuronina commixta* Walker, Cat. Neur. Brit. Mus. : 10.
- 1861. *Neuronina vestita* Hagen, Syn. Neur. N. Amer. : 253.
- 1861. *Neuronina commixta* Hagen, Syn. Neur. N. Amer. : 253.
- 1863. *Phryganea vestita* McLachlan, Ent. Ann. : 156 (*commixta* reduced to synonymy).
- 1864. *Phryganea vestita* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 871.
- 1873. *Phryganea vestita* Hagen, Verh. Zool. Bot. Ges. Wien, 23 : 418.
- 1873. *Phryganea vestita* Hagen, Proc. Bost. Soc. Nat. Hist., 15 : 385.
- 1892. *Phryganea vestita* Banks, Trans. Amer. Ent. Soc., 19 : 362.
- 1906. *Phryganea vestita* Ulmer, Notes Leyd. Mus., 28 : 2, figs. 1-3.
- 1907. *Phryganea vestita* Ulmer, Genera Insect., fasc. 60a : 26, pl. 2, fig. 5 ; pl. 29, fig. 7.
- 1907. *Phryganea vestita* Banks, Cat. Neur. Ins. U.S. : 35.
- 1924. *Prophryganea vestita* Martynov, Ann. Mag. Nat. Hist., (9) 14 : 211.
- 1934. *Dasystegia vestita* Milne, St. N. Amer. Trich., 1 : 3, 7.
- 1934. *Phryganea vestita* Betten, N.Y. State Mus. Bull., 292 : 294, pl. 40, figs. 7-9.

Walker describes the species as follows :

"*Ferruginea* ; *thorax fusco bivittatus* ; *alae anticae fusco confertim irroratae, posticae cinereae*."

"*Ferruginous* : thorax with two brown stripes : thighs and tips of the shanks of the anterior legs brown : hind-legs testaceous : fore-wings thickly reticulated with brown, which is most prevalent towards the tips : hind-wings gray, bordered with brown. Length of the body 6 lines : of the wings 18 lines.

"*a, b. Georgia. From Mr. Abbot's collection.*"

And *P. commixta* as follows :

" *Nigra* ; corpore subtus antennis pedibusque ferrugineis ; alae anticae fuscae, macula magna discali sublimpida, guttis apicalibus albidis ; alae posticae subcinereae, apice margineque postico fuscis.

" Black, clothed with pale hairs, beset with black bristles, underside, antennae

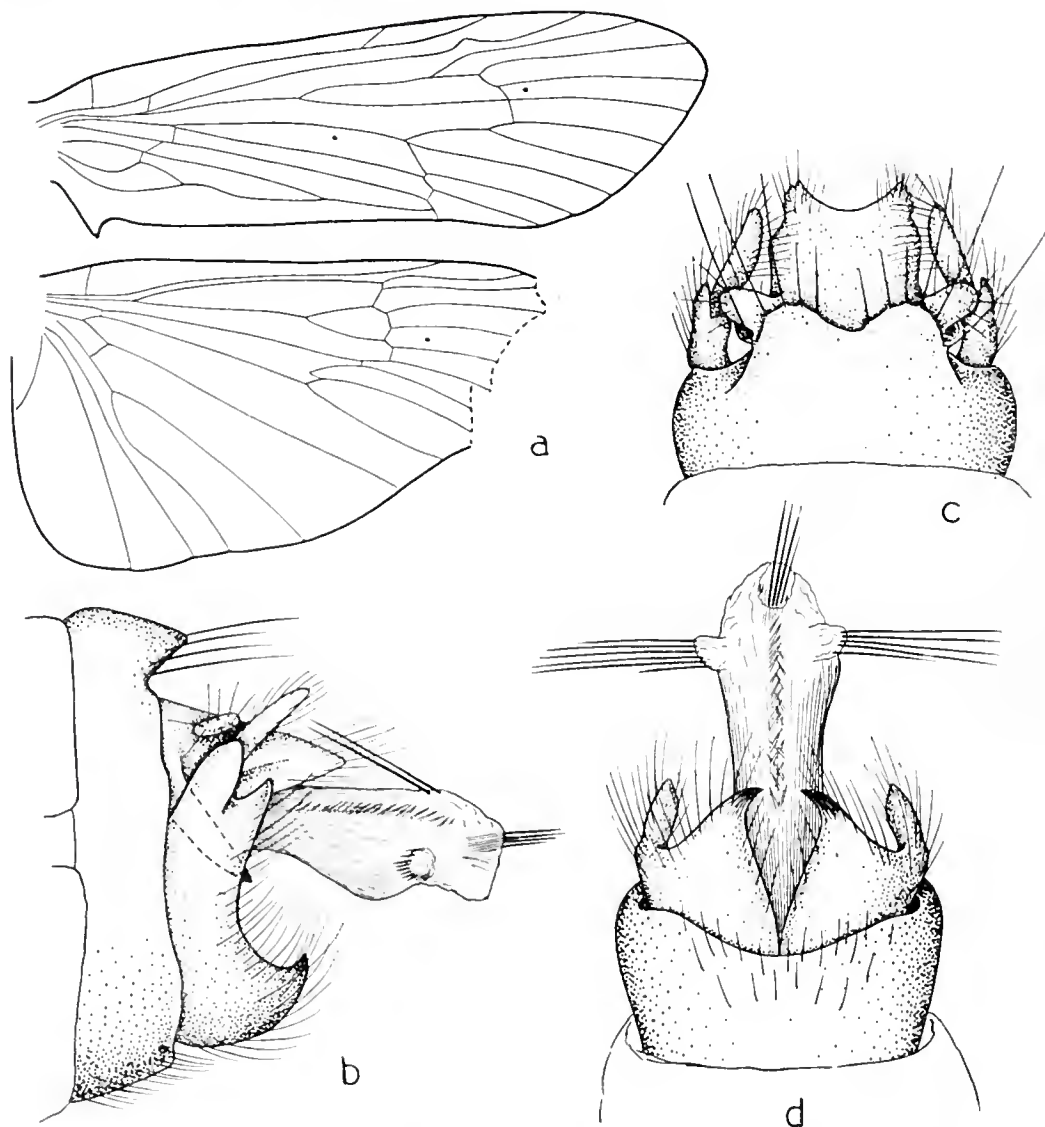


FIG. 41.—*Phryganica vestita* Walk. ♂ : *a*, wings ; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

and legs ferruginous : fore-wings brown ; discal areolet, discal cell and areolet of the thyridium mostly almost colourless ; fore border slightly mottled ; apical and subapical areolet with whitish dots ; veins brown : hind-wings slightly gray, brown at the tips and along the hind borders. Length of the body $4\frac{1}{2}$ lines ; of the wings 12 lines.

" *a*. Georgia. From Mr. Abbot's collection."

To this we add :

Head above brown, the ocelli yellow ; two triangular patches of short, white

hair, broad at the posterior margin, passing between the two posterior ocelli and ending in a point at the base of the antennae, a clear line between these two patches; in front, the head is sparsely covered with black hair; *antennae* yellow, each joint encircled with a broad ring of black hair; palpi brown, with brown and with some white hair; pronotum with short, white hair on each side of the middle line, longer black bristles further to the sides; mesonotum brown to black, with some very short, white hair; metanotum and *abdomen* yellow, with some median black spots toward the posterior margin in most of the segments; front femora and tips of the tibiae and tarsi dark brown; middle tibiae and tarsi also tipped with brown; *hind legs* pale throughout; spines and spurs on all the legs yellow; *fore wings* reticulated brown and whitish, the membrane covered with white and black hair; the posterior part of the wing, roughly the area posterior to M , is darker than the remainder, the more conspicuous white areas being the spots at the margin in the apical cells, an indistinct band running parallel to the postapical margin, and a dark spot on the costal margin opposite the bend in R_1 , with a white area on either side; *hind wings* with the apical margin brown; cross-vein $m-cu$ of the hind wing is very sharply angled toward the base of the wing; vein M of this wing is two-branched in the male, three-branched in the female.

Length of the fore wing, male, 15 mm.; of the female, 17 mm.

Genitalia, male.—The apical margin of the 9th tergite, produced and widely excised, is fringed with very long, yellow hairs; there is a large, plate-like upper penis-cover (?) from above with the apical margin widely excised, and with a pair of rounded, outspread plates towards the basal lateral margins; seen from the side, there is a large branch with an acute apex arising at the base of each of these plates directed downwards and distally; from above the branch is spoon-shaped, but with the apex produced in an acute point; penis membranous, furnished at its apex with at least four bunches of long, yellow bristles, one bunch directed distally, a pair laterally, and either one or two long bristles basally; the type is somewhat denuded; there is also a series of short bristles along the dorsal surface, or perhaps lining an internal tube for a little distance back from the apex; inferior appendages large and forked; from the side the basal fork is represented by a hook curving inwards; separated from this by a long, curved excision is a small, narrow, pointed 2nd fork directed upwards; there is a shuttle-shaped 3rd fork, arising slightly outside the 2nd, a little longer and broader as seen from the side; the 4th fork, which is possibly jointed to the main structure, is long and narrow, and arises from behind the 3rd; from beneath the basal forks are claw-shaped, directed inwards.

We designate as the type of *vestita* the male specimen from Georgia. Walker's second specimen is a female, without abdomen, also from Georgia.

Walker's *commixta* is the same as *vestita*, the male type differing from the type of the latter only in its smaller size. This type also lacks the abdomen.

It should be noted that, while not shown in the type, there are, in most specimens, conspicuous white areas at the base and along the posterior margin

of the fore wing ; two such areas are commonly triangular in shape, the bases of the triangles on the posterior margin, the apices at about the level of Cu_1 .

***Neuronia concatenata* Walker.**

(Fig. 42.)

- 1852. *Neuronia concatenata* Walker, *partim*, Cat. Neur. Brit. Mus. : 8.
- 1861. *Neuronia irrorata* Hagen, *nec* Fabr., Syn. Neur. N. Amer. : 249.
- 1863. *Neuronia concatenata* McLachlan, Ent. Ann. : 156.
- 1864. *Neuronia concatenata* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 852.
- 1873. *Neuronia concatenata* Hagen, Verh. Zool. Bot. Ges. Wien, **23** : 385.
- 1873. *Neuronia concatenata* Hagen, Proc. Bost. Soc. Nat. Hist., **15** : 384.
- 1892. *Neuronia concatenata* Banks, Trans. Amer. Ent. Soc., **19** : 362.
- 1907. *Neuronia concatenata*, Ulmer, Genera Insect., fase. **60a** : 23, pl. 29, fig. 5.
- 1907. *Neuronia concatenata*, Banks, Cat. Neur. Ins. U.S. : 35.
- 1908. *Neuronia concatenata*, Banks, Psyche, **15** : 61.
- 1924. *Banksiola concatenata* Martynov, Ann. Mag. Nat. Hist., (9) **14** : 216.
- 1934. *Banksiola concatenata* Milne, St. N. Amer. Trich., **1** : 5, 9.

Walker describes the species as follows :

"*Rufa* ; *antennae piceae* ; *pedes testacei* ; *abdomen fuscum* ; *alae subhyalinae*, *anticae fusco reticulatae*.

"Red, shining : head and thorax clothed with whitish hairs : antennae piceous : abdomen brownish : legs testaceous : fore-wings pale brown, with very numerous, almost colourless dots which are mostly confluent and especially so towards the base : hind-wings subhyaline, their tips reticulated with brown ; a brown spot on the fore border opposite one on the fore-wing ; a few pale brown marks on the hind border. Length of the body 5-6 lines ; of the wings 16-18 lines.

"*a, b*. St. John's Bluff, East Florida. Presented by E. Doubleday, Esq.

"*c, d*. Georgia. From Mr. Abbot's collection.

"*e*. (?) From Mr. Children's collection."

We add :

Head brownish yellow above, with a few long, yellow hairs, the posterior warts brown ; ocelli yellow, margined with black internally ; face yellow, with sparse black hair ; *antennae* dark brown to black, the basal joints paler internally and beneath ; palpi yellow, covered with black hair ; *legs* yellow, the spurs orange, the tibiae and tarsi with black spines ; pronotum yellow, with long yellow hair, mesonotum brown, metanotum yellowish brown ; *fore wings* clear yellow with close irrorations of brown, the largest brown spot at the costal margin extending across the bend in R_1 and continued to the middle of the wing, the margin of the *hind wing* bordered almost continuously with brown from its apex to the tips of the anal veins ; at the base of the wing there is a brown spot along Sc , and to a less extent along R_1 and extending irregularly to the base of the anal veins ; hind wings clear, the apex irrorated with brown, a conspicuous brown spot on the costal margin at the tip of R_1 extending into the wing to the region of the cross-vein rm ; media is three-branched in the hind wing (female), the middle branch arising from the posterior branch,

forming with it a short pedicel for the additional cell ; *abdomen* blackish above, yellow beneath, the last few segments with long, yellow hairs.

Length of the fore wing, female, 15–18 mm.

Genitalia, female.—Terminal dorsal segment produced in a broad triangle beyond which is a pair of plates fused together, each with an obliquely truncate apical margin, and with a triangular excision between them at their apices ; there is an unpigmented, longitudinal streak on the integument arising from

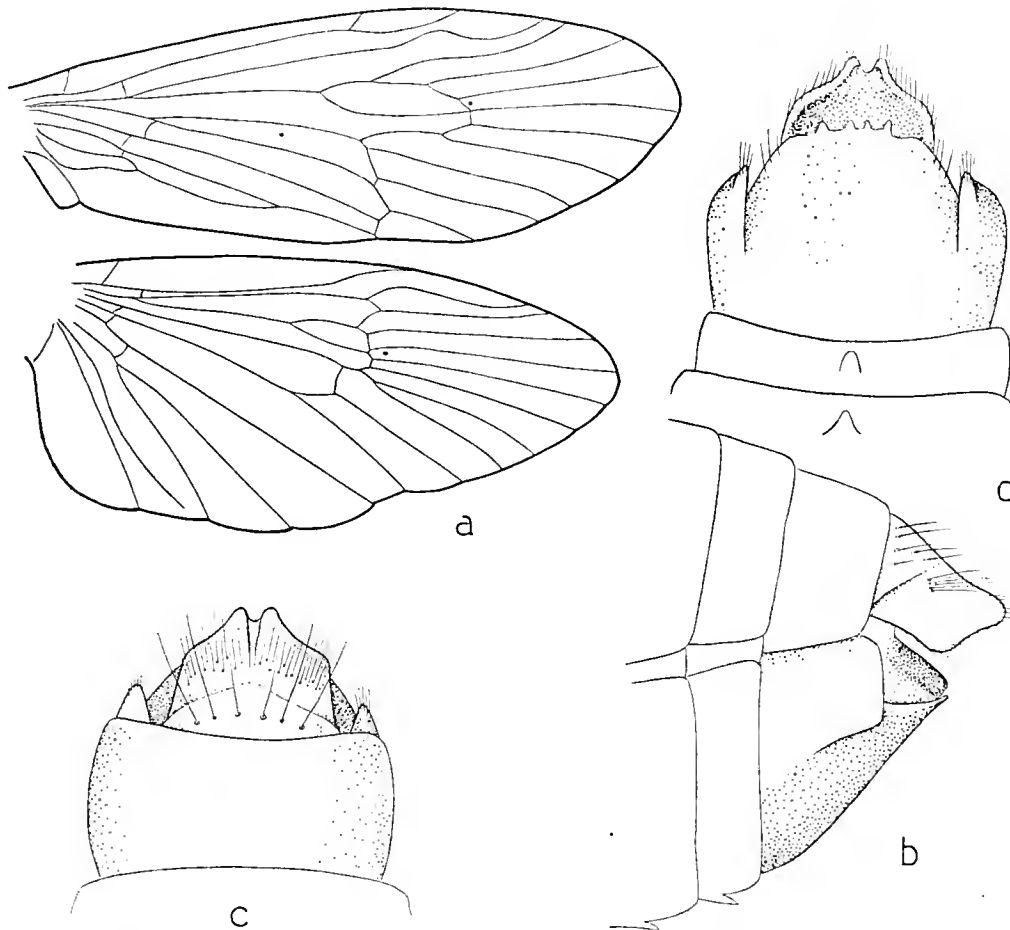


FIG. 42.—*Neuronium concatenata* Walk. ♀: *a*, wings ; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

the centre of the excision and extending to the base of the plates, giving the false appearance of a division between them ; these plates form a wide hood presenting, from the side, an obliquely truncate apical margin, with both angles rounded ; from beneath the margin of the 8th (?) segment is widely excised and inset in the excision is a large plate, the apical margin broadly rounded, bearing (in the type) two small fingers towards the lateral margins, and two smaller ones centrally ; in the type the margin has been partly eroded so that only one of these fingers remains complete ; the margin has therefore been figured from one of the paratypes ; there is a strong tooth on the penultimate and a rather smaller one on the antepenultimate sternite.

We designate as the type of this species the single female specimen from Georgia (there appear to have been two specimens originally), because this is the best preserved of the four specimens now remaining that formed part of the series that Walker had under consideration. The two specimens from East Florida, also females, agree with the type except in being slightly larger. The female listed by Walker as from Mr. Children's collection we make the type of a new species, *Neuronia childreni* (see below).

After careful comparison of female examples, we conclude that the species described and figured by Betten (1934, *N.Y. State Mus. Bull.*, 292 : 297, pl. 41, figs. 2-8), being probably a form referred to in some other references cited above, must also be considered distinct.

***Neuronia childreni* sp. n.**

(Fig. 43.)

1852. *Neuronia concatenata* Walker, *partim*, Cat. Neur. Brit. Mus. : 8.

Walker describes the species under *N. concatenata* as follows :

"*Rufa* : *antennae piceae* ; *pedes testacei* ; *abdomen fuscum* ; *alae subhyalinae, anticae fusco reticulatae*.

"Red, shining : head and thorax clothed with whitish hairs : antennae piceous : abdomen brownish : legs testaceous : fore-wings pale brown, with very numerous almost colourless dots which are mostly confluent and especially so towards the base : hind-wings subhyaline, their tips reticulated with brown ; a brown spot on the fore border opposite one on the fore-wing ; a few pale brown marks on the hind border. Length of the body 5-6 lines ; of the wings 16-18 lines.

"*e.* (?) From Mr. Children's collection."

We add :

Head, mesothorax and metathorax black above, contrasting strongly with the yellow warts and bristles of the prothorax and the yellow tegulae ; palpi yellowish brown ; *legs* (3rd pair lacking) and their spurs yellow, the femora darker, particularly at the base ; *fore wings* considerably broader in proportion to their length than in *concatenata*, the colour pattern not unlike that of the latter species ; the brown spot at the pterostigma, the adjoining clear area and the dark margin of the wing apex are somewhat more sharply contrasted than in *concatenata*, and the brown area at the base of the wing is lacking ; the middle of the three branches of the media of the *hind wing* is fused for a very short distance with the anterior branch.

Length of the fore wing, female, 17 mm.

Genitalia, female.—The apical margin of the 9th tergite produced in a broad triangle beyond which is a pair of fused triangular plates, partly devoured by pests in the type ; from the side there is a large, triangular side-piece to the 9th segment ; from beneath there is a broad plate, set between these side-pieces with the apical angles produced in rather long fingers ; the margin of the plate is damaged and the outline uncertain ; no ventral teeth.

We designate Walker's specimen *e* under *Neuronia concatenata*, a female, as the type of this species. In general appearance it is darker than *concatenata*, not because the brown of the fore wing is relatively greater in extent, but rather because the pale areas are not so transparently white.

As in the case of other specimens listed as of Mr. Children's collection, the locality is unknown.

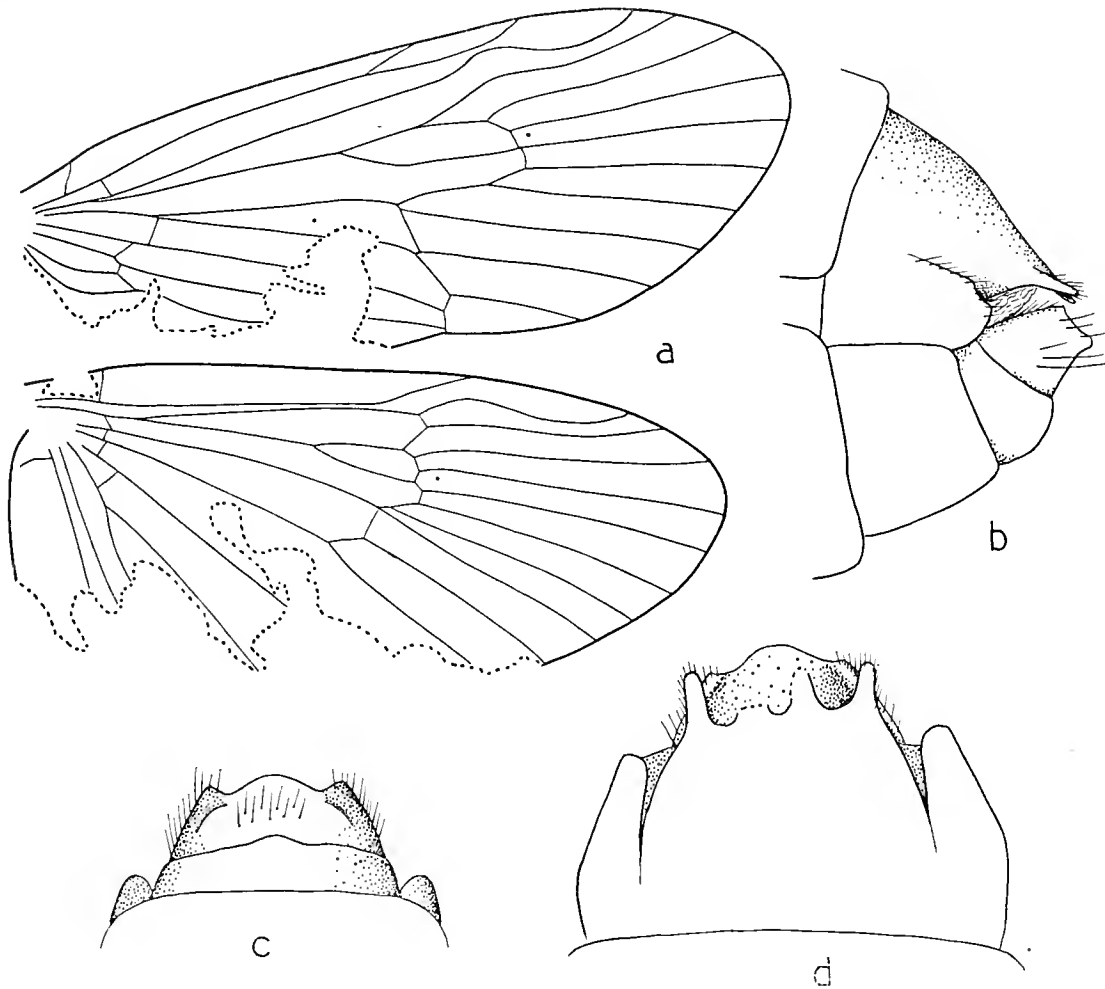


FIG. 43.—*Neuronia childreni* sp. n. ♀: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

***Neuronia ocelligera* Walker.**

(Fig. 44.)

- 1835. *Neuronia stygipes* Harris, Hiteheock's Report, ed. 2 : 582 (name without description).
- 1852. *Neuronia ocelligera* Walker, Cat. Neur. Brit. Mus. : 8.
- 1861. *Neuronia ocelligera* Hagen, Syn. Neur. N. Amer. : 250.
- 1863. *Neuronia ocelligera* McLachlan, Ent. Ann. : 156.
- 1864. *Neuronia ocelligera* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 852.
- 1873. *Neuronia stygipes* Hagen, Verh. Zool. Bot. Ges. Wien, 23 : 388.
- 1873. *Neuronia ocelligera* Hagen, Verh. Zool. Bot. Ges. Wien, 23 : 389 (suggests that *ocelligera* and *stygipes* are perhaps the same).

1873. *Neuronina ocelligera* Hagen, Proc. Bost. Soc. Nat. Hist., 15 : 385.
 1873. *Neuronina stygipes* Hagen, Proc. Bost. Soc. Nat. Hist., 15 : 385.
 1877. *Neuronina stygipes* Provancher, Le Nat. Can., 9 : 217.
 1878. *Neuronina stygipes* Provancher, Petite Faun. Ent. Can., 2 : 129.
 1892. *Neuronina ocelligera* Banks, Trans. Amer. Ent. Soc., 19 : 362.
 1892. *Neuronina stygipes* Banks, Trans. Amer. Ent. Soc., 19 : 362.
 1907. *Neuronina ocelligera* Ulmer, Genera Insect., fasc. 60a : 24.
 1907. *Neuronina stygipes* Ulmer, Genera Insect., fasc. 60a : 24.
 1907. *Neuronina ocelligera* Banks, Cat. Neur. Ins. U.S. : 35.
 1907. *Neuronina stygipes* Banks, Cat. Neur. Ins. U.S. : 35.
 1924. *Oligostomis ocelligera* Martynov, Ann. Mag. Nat. Hist., (9) 14 : 215.
 1924. *Oligostomis stygipes* Martynov, Ann. Mag. Nat. Hist., (9) 14 : 215.
 1934. *Oligostomis ocelligera* Milne, St. N. Amer. Trich., 1 : 8 (*stygipes* reduced to synonymy).
 1934. *Neuronina ocelligera* Betten, N.Y. State Mus. Bull., 292 : 299.
 1934. *Neuronina stygipes* Betten, N.Y. State Mus. Bull., 292 : 302, pl. 42, figs. 8-9.
 1938. *Neuronina stygipes* Ross, Psyche, 45 : 27 (type-specimen *stygipes* Hagen designated).

Walker describes the species as follows :

" *Nigra* ; *tibiae piceae* ; *alae testaceae*, *anticae nigro reticulatae*.

" Male.—Black, with pale hairs and black bristles : shanks pitchy : wings testaceous : fore-wings reticulated with black, which forms spots along the borders : hind-wings with black spots along the borders. Length of the body $4\frac{1}{2}$ lines ; of the wings 13 lines.

" *a. Nova Scotia.* From Lieut. Redman's collection."

We add :

Head above, dark brown to black, the area immediately posterior to and below the eye yellow ; ocelli prominent, whitish, a bunch of black and golden hair between them and the bases of the antennae ; *antennae* stout, the basal joint black, the others dark brown, a narrow, black line in the middle of each joint ; palpi brown, with short, black hair ; pronotum with two bunches of long, yellow hair ; mesonotum black, the tegulae yellow, covered with yellow hair ; *legs* brown, the spurs a little lighter, black spines on the middle and hind legs ; *fore wings* yellow, with close reticulations of dark brown ; brown spots on the tips of the veins at the apical margin ; three larger brown spots on the costal margin at the tips of R_1 , Sc, and the anterior branch of Sc ; a brown spot also on the posterior margin at the tips of the anal veins ; *hind wing* yellow and dark brown, the brown restricted roughly to the basal half of the wing, except that the costal margin is yellow almost to the humeral cross-vein ; marginal brown spots at the tips of the veins, those on R_3 , R_4 and R_5 being confluent.

Length of the fore wings, male, 14.5 mm.

Genitalia, male.—Apical margin of the 9th tergite very widely excised, the base of the excision slightly sinuous and extending nearly the whole breadth of the segment ; in the excision is a large dorsal plate or perhaps an upper penis-cover, as it lies very closely above the penis ; from above, it is broadly triangular in its foreshortened aspect ; at the base of this plate, on each side, is a small, irregularly-shaped superior appendage which varies in shape in different examples, sometimes furcate and sometimes bearing long needle-like

bristles ; in the type the appendages are simple and bear no bristles ; penis stout, apex membranous ; it is furnished with a pair of stout, strongly chitinized sheaths terminating, as seen from beneath, in inturned hooks ; inferior appen-

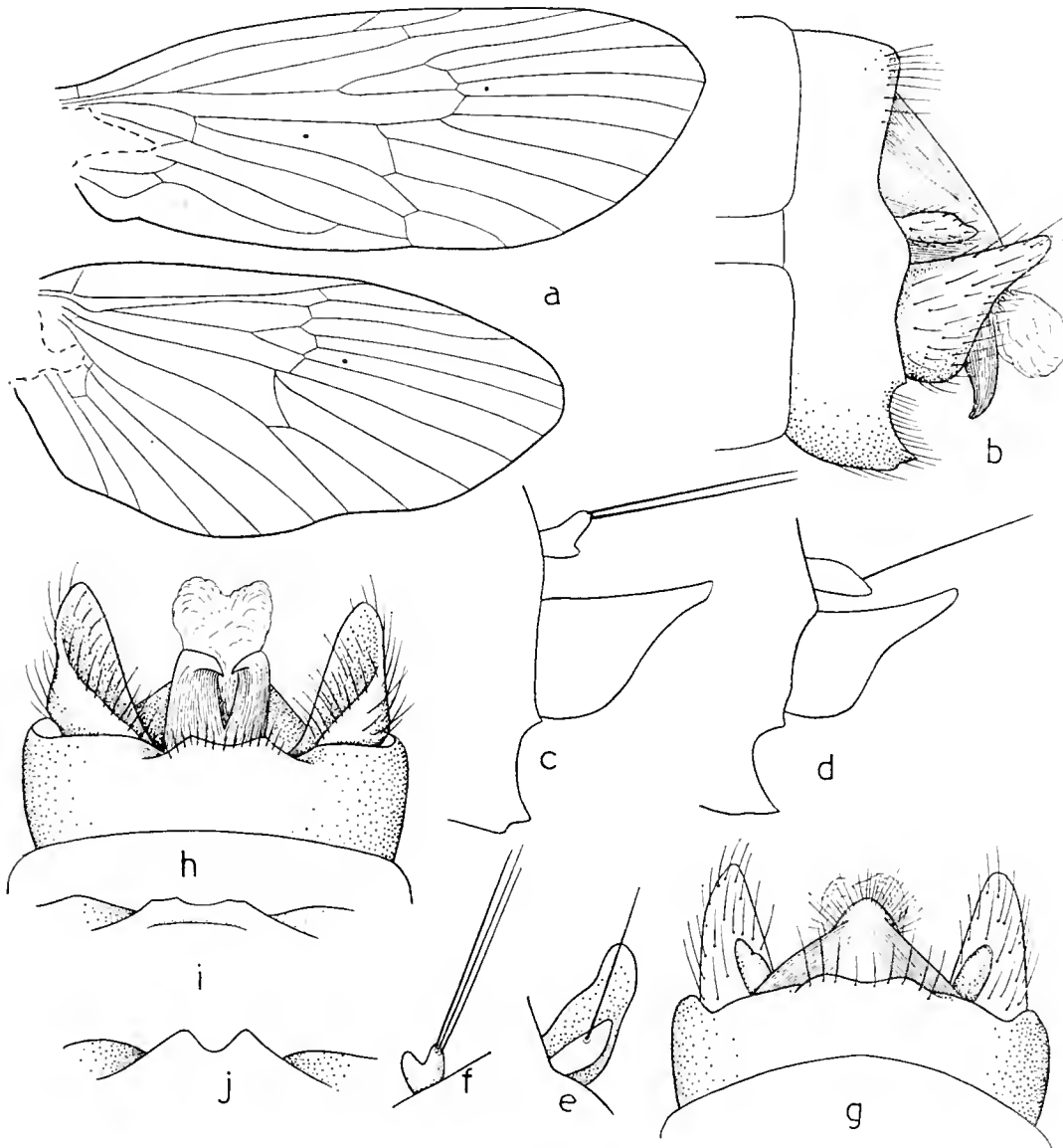


FIG. 44.—*Neuronina ocelligera* Walk. ♂: *a*, wings; *b*, genitalia, lateral; *c*, superior and inferior appendages, from a type of *N. stygipes* Hagen, lateral, *d*, the same, from an example from the Betten collection, *e*, the same, from above; *f*, superior appendage, from the *stygipes* type, from above; *g*, genitalia, dorsal, from the type, *h*, ventral; *i*, margin of the 9th sternite, from the *stygipes* type, *j*, the same, from the Betten example.

dages from the side, broad, considerably dilated at the base along the lower margin, tapering abruptly to an acute apex ; the appendage is also subject to variation in shape ; the margin of the 9th sternite is produced at its centre in a pair of triangular projections, which also vary in individuals.

The figures given of these variable parts are drawn from different examples, and it will be noted that in the co-type of Hagen's *stygipes*, received by the British Museum in exchange from Mr. Banks, the superior appendages are bifurcate, and carry three bristles on the one appendage and two on the other. In this specimen the inferior appendage is less dilated on the lower margin than in *ocelligera*, with the apical part rather more slender; the centre of the apical margin of the 9th sternite is rather more widely produced, with the apices of the produced angles flattened.

In an example in the Betten collection the superior appendages are simple, each carrying a single bristle. The inferior appendages are more abruptly dilated along the basal lower margin than in the *stygipes* co-type, with the apical part more slender, while the margin of the 9th sternite is produced at its centre in two pronounced triangles side by side.

The type of the species is Walker's one specimen, a male.

***Neuronia pardalis* Walker.**

(Figs. 45, 46.)

- 1852. *Neuronia pardalis* Walker, Cat. Neur. Brit. Mus. : 7.
- 1861. *Neuronia pardalis* Hagen, Syn. Neur. N. Amer. : 250.
- 1863. *Neuronia pardalis* McLachlan, Ent. Ann. : 161.
- 1864. *Neuronia pardalis* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 852.
- 1873. *Neuronia pardalis* Hagen, Verh. Zool. Bot. Ges. Wien, **23** : 394.
- 1873. *Neuronia pardalis* Hagen, Proc. Bost. Nat. Hist., **15** : 385.
- 1877. *Neuronia pardalis* Provancher, Le Nat. Can., **9** : 216.
- 1878. *Neuronia pardalis* Provancher, Petite Faun. Ent. Can., **2** : 128.
- 1892. *Neuronia pardalis* Banks, Trans. Amer. Ent. Soc., **19** : 362.
- 1896. *Neuronia pardalis* Lintner, N.Y. State Mus. Fortieth Report : 298-299, fig.
- 1907. *Neuronia pardalis* Ulmer, Genera Insect., fasc. **60a** : 24.
- 1907. *Neuronia pardalis* Banks, Cat. Neur. Ins. U.S. : 35.
- 1915. *Neuronia pardalis* Lloyd, Journ. N.Y. Ent. Soc., **23** : 201.
- 1924. *Regina pardalis* Martynov, Ann. Mag. Nat. Hist., (9) **14** : 215.
- 1934. *Eubasilissa pardalis* Milne, St. N. Amer. Trich., **1** : 4, 9.
- 1934. *Neuronia pardalis* Betten, N.Y. State Mus. Bull., **292** : 300, pl. 42, fig. 1.

Walker describes the species as follows :

"*Atra* ; *caput subtus luteum* ; *thorax antice luteo-hirtus* ; *alae anticae luteo confertim guttatae* ; *alae posticae antice luteo guttatae, fascia lata subapicali lutea*.

"Black : head with luteous hairs above, luteous beneath : thorax with luteous hairs in front : fore-femora ferruginous : fore-wings with numerous luteous dots which are mostly confluent in the middle of the wing of the male ; hind-wings with a few luteous spots along the fore border and with a broad luteous band extending obliquely from the tip along part of the hind border. Length of the body 6-7 lines ; of the wings 22-24 lines.

"*a, b.* Nova Scotia. From Lieut. Redman's collection."

We add :

Head black above, the posterior warts yellow ; *ocelli* white, not very prominent ; a tuft of yellow hair between the antennae ; yellow hair also on

the posterior warts ; face and the area extending under and partly posterior to the eye, yellow ; *antennae* very dark brown, the joints indistinctly shown ; palpi yellow ; *thorax* and *abdomen* black ; the anterior part of the mesonotum with a stripe of yellow hair on each side of the median line ; posterior part of the mesonotum with a few yellow hairs ; *fore* and *middle legs* deep brown, the

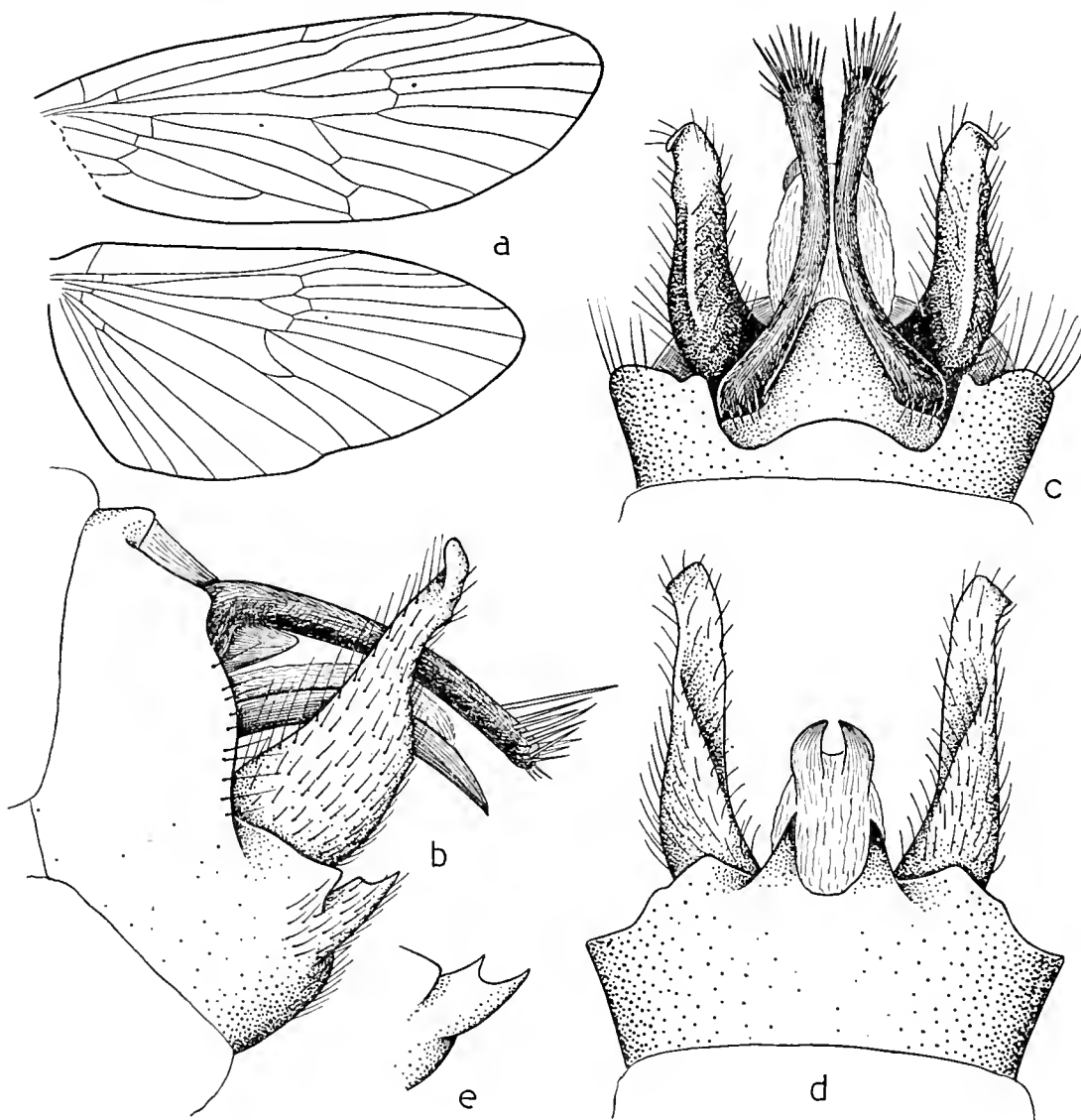


FIG. 45.—*Neuronidia pardalis* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral; *e*, ventral process, lateral, from an example received from Mr. Nathan Banks.

proximal ends of the femora lighter, hind legs wanting in the type ; tegulae yellow, with yellow hair ; *fore wings* spotted with yellow and dark brown in about equal proportions, the brown predominating somewhat in the distal third of the wings ; *hind wings* yellow with brown markings ; the basal half is mostly brown, but there are yellow spots increasing in size toward the costal margin ; the distal half is clear yellow except that there is a brown area at the

apex extending from the middle of cell R_3 to the middle of cell M_1 ; in addition, there are marginal brown spots on the tips of R_2 , R_3 , M_{1+2} , M_{3+4} , Cu_1 and Cu_{1a} .

Length of the fore wing, male, 21 mm.

Genitalia, male.—Apical margin of the 9th tergite deeply excised, with the basal margin of the excision produced at its centre; there is a short and broad triangular dorsal plate, on each side of which is a superior appendage; these are long, curving slightly downward, each with a bunch of stiff bristles mainly on the upper surface at its apex; no apparent upper penis cover; penis as long as the superior appendages, arching downward, with possibly a lower penis-cover, apex excised; inferior appendages stout at the base, narrowing somewhat abruptly at about halfway and directed distally and upwardly; the margin of the 9th sternite irregularly produced, at its centre still further produced in a pair of sharp teeth.

A figure is given of the lateral aspect of the centre of the 9th sternite of the male, from one of the Banks examples.

Genitalia, female.—The apex of the abdomen from above forms a hood whose apical margin is excised at its centre, the margin on each side of the excision sinuous; under the hood is a trilobed process, the outer lobes converging, the inner lobe directed slightly downward and away from the outer lobes; this inner lobe is complex in its structure, being itself trilobed, the two upper lobes pressed closely together and, from above, covering the inner lobe; the apical margin of the segment beneath these processes is deeply excised and sinuous.

We designate as the type of the species the male specimen of Walker's description. The second specimen, a female, the genitalia of which are described above, we use as the type of a colour variety:

***Neuronia pardalis* Walk., var *redmani* nov.**

Head black above, the posterior warts yellow, with yellow hair on the median line in front, on the posterior warts and behind the eyes; face and palpi yellow; *antennae* black, the joints indistinct; *thorax* black throughout, with yellow hair on the warts of the pronotum and on the tegulae; *fore legs* black, the coxae and femora marked with yellow internally; *middle* and *hind* legs dark brown to black, the femora somewhat lighter; spines and spurs of all the legs yellow; *fore wings* brown, with numerous yellow spots rather uniformly distributed, larger along the costal margin than elsewhere; *hind wings* brown at the base, the brown occupying more than half of the wing area; some yellow spots enclosed within the dark area along the costal margin and near the base of the wing; near the apex is a broad, curving, yellow band extending from the costal margin to the anal angle; the apical margin is brown, the boundary between the yellow band and the brown margin forming a crenulated line.

Length of the fore wing, female, 22 mm.

This variety is decidedly darker than the male type of *pardalis*, the brown colour predominating in both fore and hind wings; the yellow in both wings is

also duller than in the male type. Mr. Banks has sent specimens for comparison, including some males which, while agreeing more or less with the type as to genitalia, approach the variety in colour, and a female which agrees with the variety *redmani* in respect of the genitalia and with the male type of *pardalis* in colour.

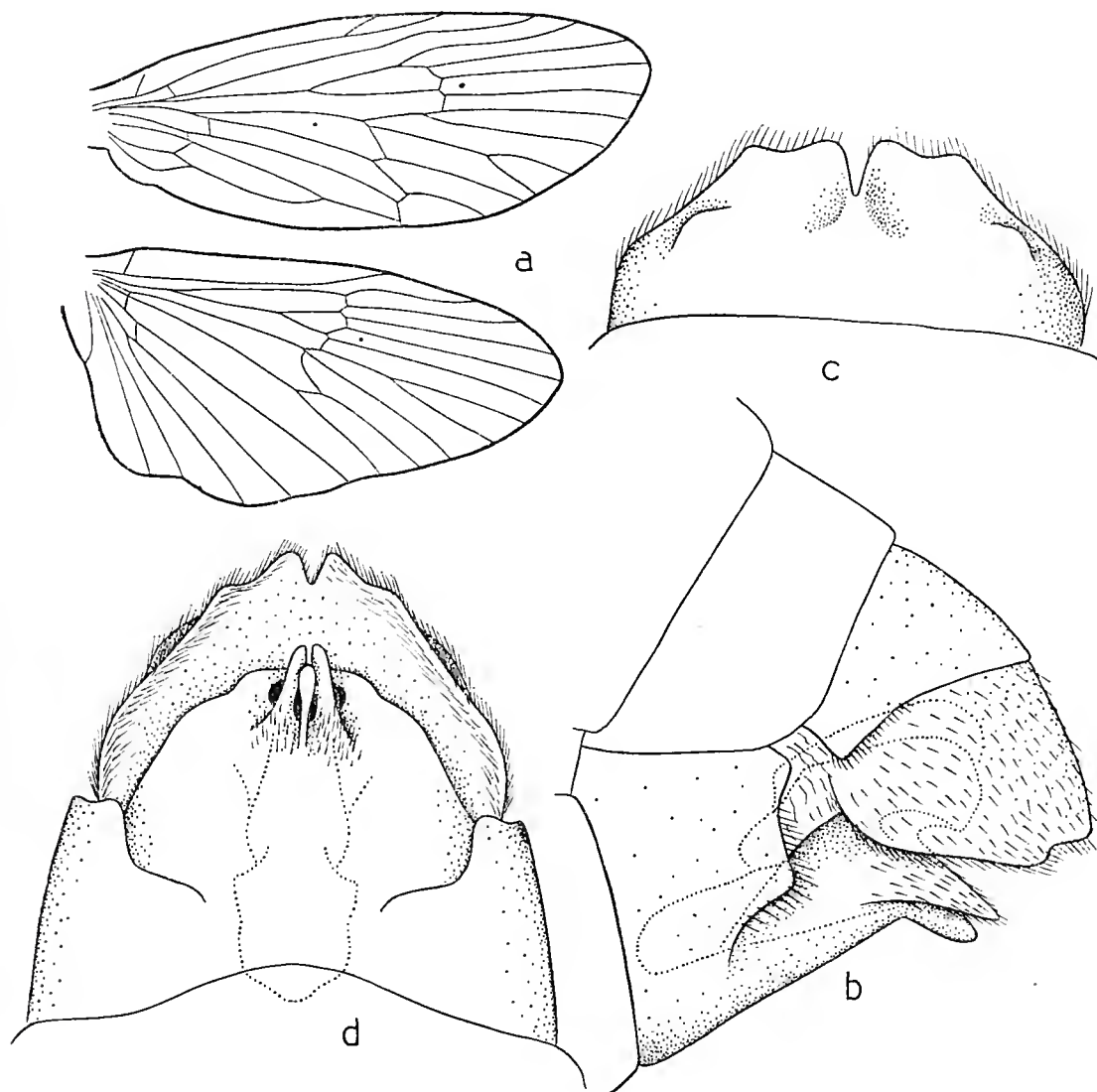


FIG. 46.—*Neuronidia pardalis* Walk. var. *redmani* nov. ♀: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

***Neuronidia ocellifera* Walker.**

(Fig. 47.)

- 1852. *Neuronidia ocellifera* Walker, Cat. Neur. Brit. Mus. : 8.
- 1852. *Neuronidia fusca* Walker, *partim*, Cat. Neur. Brit. Mus. : 9.
- 1861. *Neuronidia ocellifera* Hagen, Syn. Neur. N. Amer. : 252.

1863. *Neuronina ocellifera* McLachlan, Ent. Ann. : 156, 161.
 1864. *Neuronina ocellifera* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 852.
 1873. *Neuronina ocellifera* Hagen, Verh. Zool. Bot. Ges. Wien, **23** : 400.
 1873. *Neuronina ocellifera* Hagen, Proc. Bost. Soc. Nat. Hist., **15** : 385.
 1877. *Neuronina ocellifera* Provancher, Le Nat. Can., **9** : 217.
 1878. *Neuronina ocellifera* Provancher, Petite Faun. Ent. Can., **2** : 128.
 1892. *Neuronina ocellifera* Banks, Trans. Amer. Ent. Soc., **19** : 362.
 1907. *Neuronina ocellifera* Ulmer, Genera Insect., fasc. **60a** : 24.
 1907. *Neuronina ocellifera* Banks, Cat. Neur. Ins. U.S. : 35.
 1909. *Neuronina postica* Vorhies, nec Walker, Trans. Wisc. Acad. Sci., **16** : 658, pl. 54, figs. 7-10.
 1924. *Ptilostomis ocellifera* Martynov, Ann. Mag. Nat. Hist., (9) **14** : 216.
 1934. *Ptilostomis postica* Milne, nec Walker, St. N. Amer. Trich., **1** : 6.
 1934. *Neuronina postica* Betten, nec Walker, N.Y. State Mus. Bull., **292** : 300, pl. 42, figs. 2-4.
 1936. *Ptilostomis ocellifera* Milne, St. N. Amer. Trich., **3** : 57.

Walker describes the species as follows :

"*Testacea ; capite thoraceque supra nigris ; antennae nigrae, apices versus ferrugineae ; alae anticae nigro subreticulatae et subfasciatae.*

"*Fem.*—Black, with black hairs and bristles : antennae ferruginous at the tip of each joint except towards the base, and wholly ferruginous towards the tips : breast, abdomen and legs testaceous : wings testaceous : fore-wings irregularly reticulated with black, which here and there forms short and irregular bands : hind-wings with a broad curved black band near the tips. Length of the body $5\frac{1}{2}$ lines ; of the wings 19 lines.

"*a.* North America. Presented by the Entomological Club."

Walker describes *Neuronina fusca* as follows :

"*Nigra ; antennae ferrugineae ; pedes testacei ; alae anticae ferrugineae fusco confertim reticulatae maculisque duabus fuscis.*

"Black, clothed with brown hairs : antennae ferruginous : abdomen beneath and legs testaceous : fore-wings ferruginous, thickly reticulated with brown, with a brown spot on the hind border and another in the disk at the base of the intermediate subapical areolets ; a few brown transverse streaks on the fore border : hind-wings slightly gray. Length of the body 6-8 lines ; of the wings 18-24 lines.

"*f-i.* Nova Scotia. From Lieut. Redman's collection."

To this we add :

Head and *thorax* above (not in good condition) dark brown, with long yellow bristles ; ocelli yellow, prominent ; *antennae* (not complete) yellow, broadly ringed with black hair ; palpi brown, with short black hair ; *legs* brownish yellow, with short hair, spines and spurs, all of almost the same colour ; *fore wings* yellow with dark brown reticulations and a covering of short black hair ; the apical margin brown with a light dot in each of the apical cells ; the most conspicuous brown area extends from the costal margin to M_1 , enclosing the cross-veins to that point, broadening suddenly at the level of R_3 , enclosing also the point in the base of cell R_4 which is distinct because of its white hair ; the similar point in cell M also distinct ; in the right wing a small white fleck in cell M_2 ; another dark area extends from the apex of cell M_2 and follows the cross-veins to the posterior margin ; *hind wings* pale yellow, the apex margined with brown ; a more distinct brown, angulated band extends from the apical

margin at the tip of R_1 and joins the marginal brown band at the level of cell Cu_1 ; *abdomen* yellowish brown with yellow hair, the anterior margins of the segments darker.

Length of the fore wing, male, 19 mm.

Genitalia, male.—The 9th tergite slightly produced at the centre of its apical margin, the produced part wide; jointed to it is a much branched structure

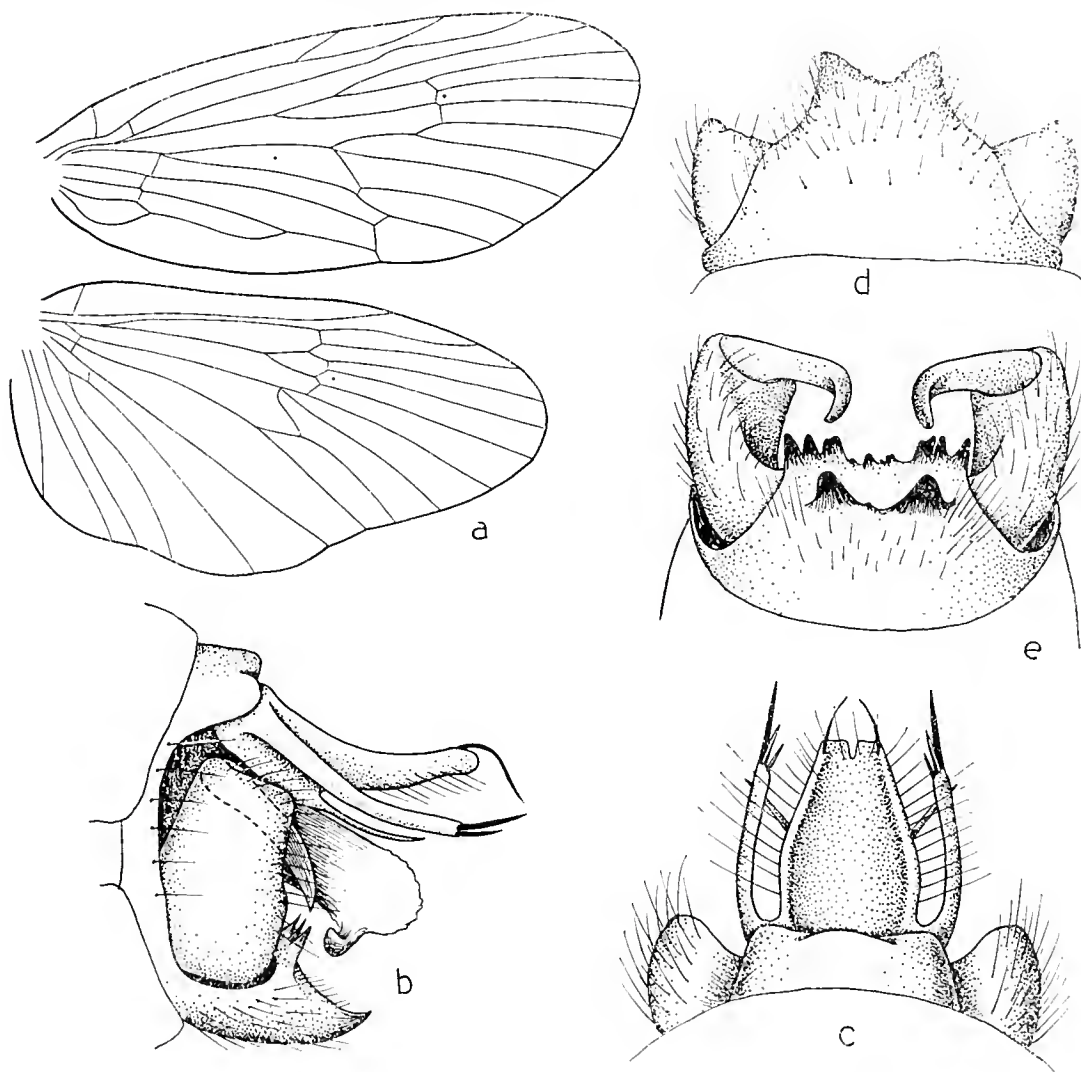


FIG. 47.—*Neuronina ocellifera* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral; *e*, 9th sternite and inferior appendages, from behind.

formed as follows: in the centre, from above, is a wide plate with a narrow, truncate apex bearing a minute excision at its centre; arising just before the apex, on the upper surface towards each lateral margin is a short, down-curved spine; on each side of the plate, at its base, is a narrow, strongly chitinized branch curving slightly below the central plate as seen from the side, and armed about the apex with some long teeth; the central plate is trough-shaped both above and beneath; from each lower, lateral margin arises a very slender

upcurving and out-turned spine; penis membranous, furnished at its apex with a pair of outstretched, sinuous horns; inferior appendages broad, somewhat quadrate from the side, the upper angle furnished on the inner side with a very large and stout downcurved hook or branch; the apical margin of the 9th sternite is produced and excised at its centre, the margins of the excision serrate; on the inner surface, just before the excised apical margin, is a ridge bearing large, irregular teeth; no ventral process.

The type of the species is a male, not, as stated in the original description, a female. A second male was found among Walker's series of *Neuronia fusca* (specimens *f-i*). In the latter specimen the markings of the fore wing are less sharply indicated than in the type; in the hind wing the angulate band is prominent, but there is only a faint brown marginal band.

As Milne (1936) has indicated, *N. ocellifera* and *N. postica* are confused in the literature. Since few of the references are accompanied by figures, we find ourselves unable to state how far that confusion extends, but it is clear that the species described and figured as *postica* by Vorhies (1909) and by Betten (1934) is Walker's *ocellifera*.

***Neuronia postica* Walker.**

(Fig. 48.)

- 1852. *Neuronia fusca* Walker, *partim*, Cat. Neur. Brit. Mus.: 9.
- 1852. *Neuronia postica* Walker, *partim*, Cat. Neur. Brit. Mus.: 9.
- 1861. *Neuronia postica* Hagen, Syn. Neur. N. Amer.: 251.
- 1863. *Neuronia postica* McLachlan, Ent. Ann.: 161.
- 1864. *Neuronia postica* Hagen, Verh. Zool. Bot. Ges. Wien, 14: 852.
- 1873. *Neuronia postica* Hagen, Verh. Zool. Bot. Ges. Wien, 23: 398.
- 1873. *Neuronia postica* Hagen, Proc. Bost. Soc. Nat. Hist., 15: 294, 385.
- 1877. *Neuronia postica* Provancher, Le Nat. Can., 9: 217.
- 1878. *Neuronia postica* Provancher, Petite Faun. Ent. Can., 2: 129.
- 1892. *Neuronia postica* Banks, Trans. Amer. Ent. Soc., 19: 362.
- 1904. *Neuronia postica* Banks, Proc. Ent. Soc. Wash., 4: 211.
- 1907. *Neuronia postica* Ulmer, Genera Insect., fasc. 60a: 24.
- 1907. *Neuronia postica* Banks, Cat. Neur. Ins. U.S.: 35.
- 1908. *Neuronia postica* Banks, Psyche, 15: 61.
- 1924. *Ptilostomis postica* Martynov, Ann. Mag. Nat. Hist., (9) 14: 216.
- 1926. *Neuronia postica* Sibley, Bull. Lloyd Libr., no. 27, Ent. Ser., 5: 104.
- 1934. *Ptilostomis ocellifera* Milne, nec Walker, St. N. Amer. Trich., 1: 5, 9.
- 1936. *Ptilostomis postica* Milne, St. N. Amer. Trich., 3: 56.

Walker describes *Neuronia postica* as follows:

"*Fusca*; palpi pedesque testacei; abdomen nigro trivittatum; alae anticae fusco reticulatae, posticae fascia brevi angulata fusca.

"Ferruginous: palpi and legs testaceous: abdomen with three blackish stripes: fore-wings indistinctly and very minutely reticulated with brown, which colour is most prevalent at the tips: hind-wings paler, with a short angular brown band in the disk towards the tip. Length of the body 7 lines; of the wings 20-22 lines.

"*a, b.* Georgia. From Mr. Abbot's collection."

Walker describes *Neuronia fusca* as follows :

" *Nigra* ; *antennae ferrugineae* ; *pedes testacei* ; *alae anticae ferrugineae fusco confertim reticulatae maculisque duabus fuscis*.

" Black, clothed with brown hairs : antennae ferruginous : abdomen beneath and legs testaceous : fore-wings ferruginous, thickly reticulated with brown, with

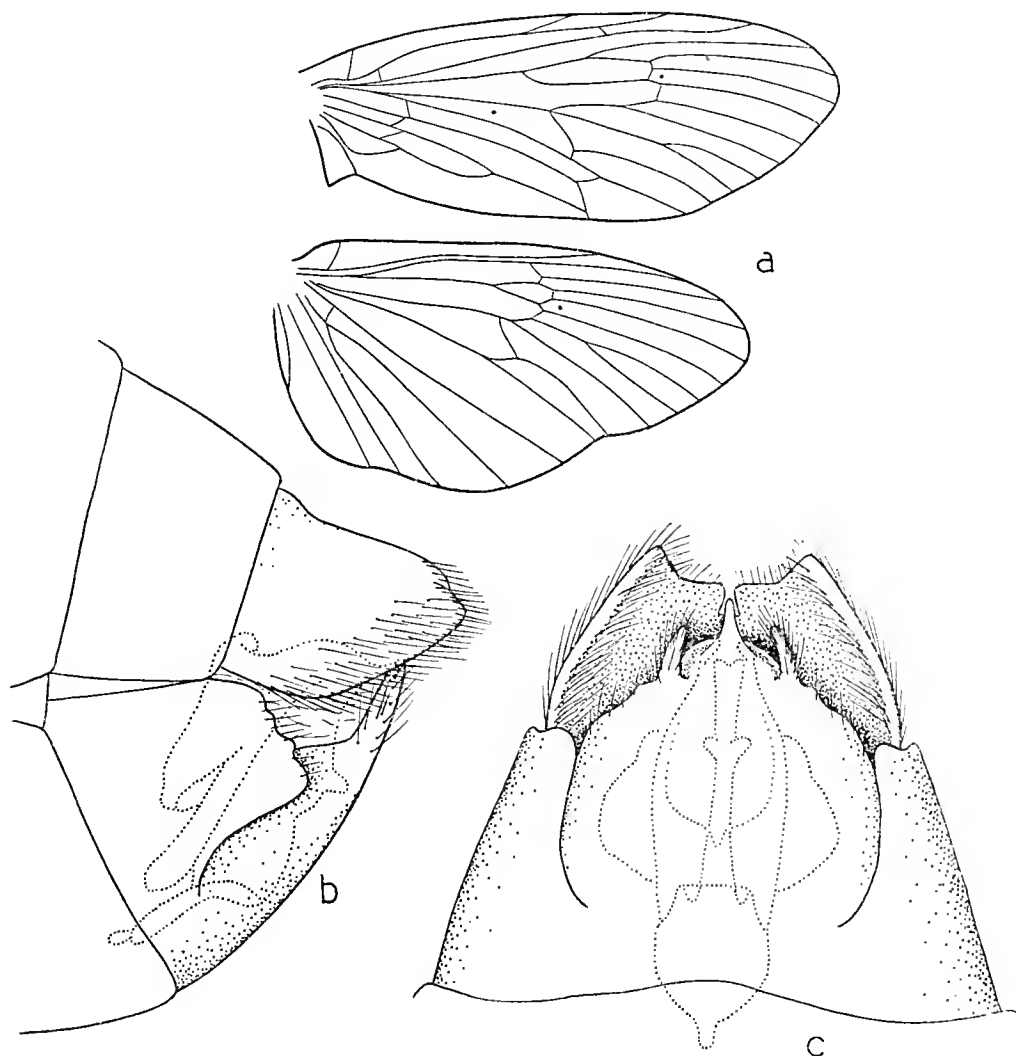


FIG. 48.—*Neuronia postica* Walk. ♀ : *a*, wings ; *b*, genitalia, lateral, *c*, ventral.

a brown spot on the hind border and another in the disk at the base of the intermediate subapical areolets ; a few brown transverse streaks on the fore border : hind-wings slightly gray. Length of the body 6–8 lines ; of the wings 18–24 lines.

" *k*-----? "

To this we add :

Head, eyes and ocelli black, head with some long, yellow hairs ; face black, covered with yellow hair ; *antennae* orange, each joint encircled with a broad band of black hair ; palpi orange, covered with black hair ; pronotum and

mesonotum black, the latter with two slightly oblique patches of long, yellow hair; femora of the *fore legs* reddish brown to black, with short, yellow bristles; tibiae and tarsi yellowish, with darker markings and with brown spines; *middle legs* brown with short, yellow pubescence and brown spines; *hind legs* yellow, the spines and spurs darker; *fore wings* orange, with brown irrorations, these most sharply shown along the costal and posterior margins, and being most dense in the apical part of the wing; a dark area on the tips of Cu_2 and the anals; the apex of the wing shows narrow marginal black lines at the tips of the veins, the colour extending into the very short apical fringe; *hind wings* yellow, with an angulated brown band extending from R_3 to Cu_1 , the apex of its angle in cell R_5 ; *abdomen* yellowish brown with irregular darker markings.

Length of fore wing, female, 20 mm.

Genitalia, female.—The abdomen terminates in a large dorsal hood whose apical margin is widely excised; beneath it is a trilobed process, outer lobes slender, middle lobe longer than the outer, apex produced and slender; there is an internal structure connected with the vagina which is here figured, but not verbally described, as these parts are not familiar to students of the Trichoptera and bear no generally accepted names.

Of Walker's two female specimens described as *Neuronina postica*, we select as the type the more heavily marked one with black head and thorax. The other specimen we consider distinct; it is identified as belonging to a new species, *Neuronina simulans*, described below (p. 107).

An examination of the genitalia indicates that one of the specimens in Dr. Ulmer's collection (Walker's *fuscus* specimen *k*), a female, presented to him in 1907, belongs to *postica*. In this specimen the head and thorax are yellow instead of black as in the type, and the brown markings in both wings are less distinct.

We are unable to state with which of the known males in the genus *postica* should be associated.

***Neuronina semifasciata* (Say).**

(Fig. 49.)

Phryganea fusca Barnston MSS.

- 1823. *Phryganea semifasciata* Say, West. Quarterly Rept., 2: 162 (no description).
- 1828. *Phryganea semifasciata* Say, Amer. Ent.: 97, pl. 44, figs. 1, 2.
- 1852. *Neuronina fusca* Walker, *partim*, Cat. Neur. Brit. Mus.: 9.
- 1859. *Phryganea semifasciata* Say, Complete Writings: 97.
- 1859. *Phryganea kovalerskii* Kolenati, var. β , Gen. et Spec. Trich., 2: 198, pl. 1, fig. 1.
- 1861. *Neuronina semifasciata* Hagen, Syn. Neur. N. Amer.: 250 (*fuscus* reduced to synonymy).
- 1863. *Neuronina semifasciata* McLachlan, Ent. Ann.: 161.
- 1864. *Neuronina semifasciata* Hagen, Verh. Zool. Bot. Ges. Wien, 14: 852.
- 1873. *Neuronina semifasciata* Hagen, Verh. Zool. Bot. Ges. Wien, 23: 396.
- 1873. *Neuronina semifasciata* Hagen, Proc. Bost. Soc. Nat. Hist., 15: 385.
- 1877. *Neuronina semifasciata* Provancher, Le Nat. Can., 9: 216.
- 1878. *Neuronina semifasciata* Provancher, Petite Faun. Ent. Can., 2: 128.
- 1892. *Neuronina semifasciata* Banks, Trans. Amer. Ent. Soc., 19: 362.
- 1905. *Neuronina semifasciata* Ulmer, Ann. k. k. Naturh. Hofmus. Wien, 20: 60, figs. 1, 2.

1907. *Neuronina semifasciata* Ulmer, Genera Insect., fasc. 60a : 24, pl. 29, fig. 4.
 1907. *Neuronina semifasciata* Banks, Cat. Neur. Ins. U.S. : 35.
 1924. *Ptilostomis semifasciata* Martynov, Ann. Mag. Nat. Hist., (9) 14 : 216.
 1934. *Ptilostomis semifasciata* Milne, St. N. Amer. Trich., 1 : 6, 9.
 1934. *Neuronina semifasciata* Betten, N.Y. State Mus. Bull., 292 : 301, pl. 42, figs. 5-7.

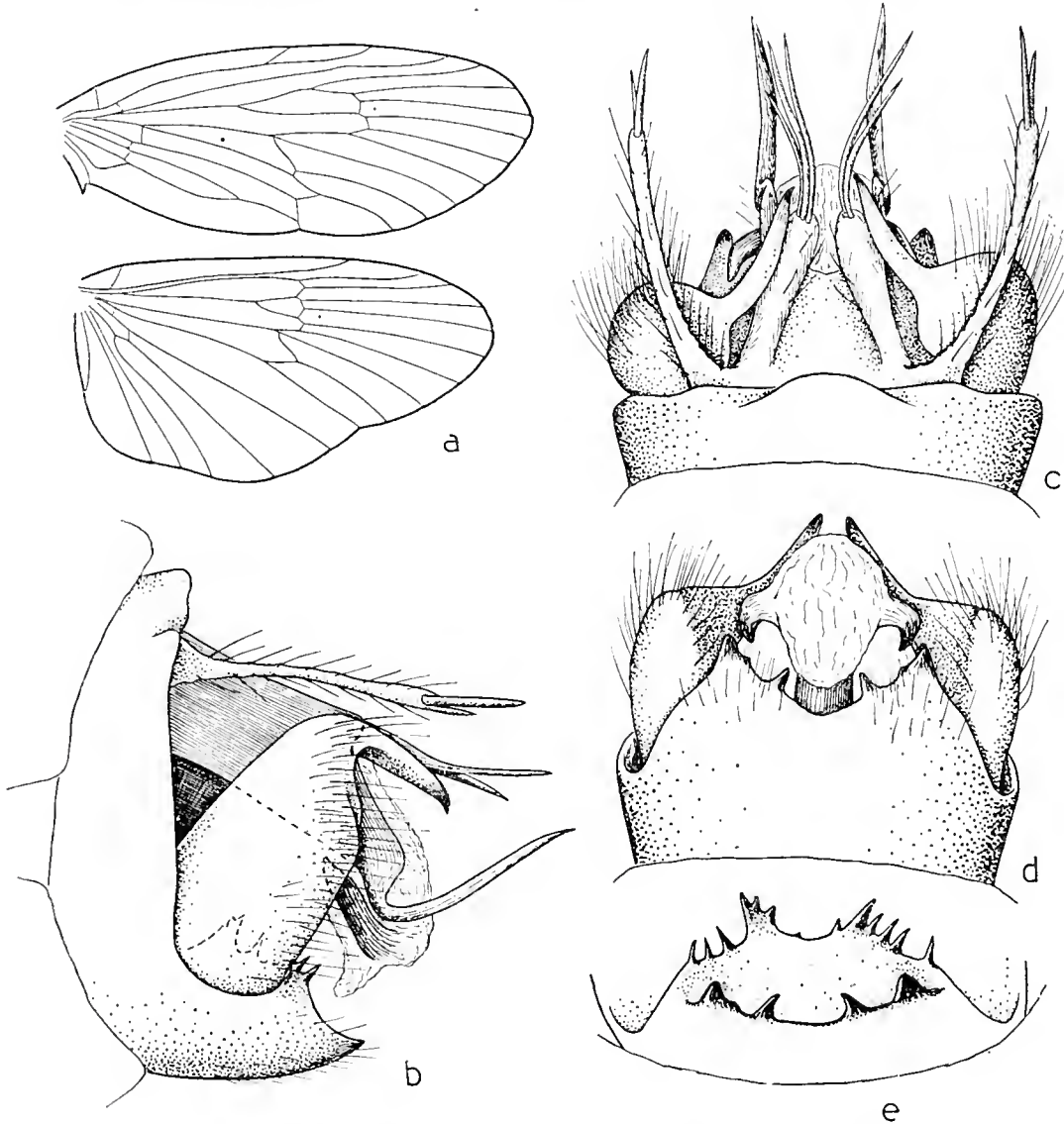


FIG. 49.—*Neuronina semifasciata* Say ♂ : *a*, wings ; *b*, genitalia, lateral, *c*, dorsal ; *d*, inferior appendages and 9th sternite, etc. ; *e*, 9th sternite, from behind.

Walker describes *Neuronina fusca* as follows :

“ *Nigra ; antennae ferrugineae ; pedes testacei ; alae anticae ferrugineae fusco confertim reticulatae maculisque duabus fuscis.* ”

“ Black, clothed with brown hairs : antennae ferruginous : abdomen beneath and legs testaceous : fore-wings ferruginous, thickly reticulated with brown, with a brown spot on the hind border and another in the disk at the base of the intermediate subapical areolets ; a few brown transverse streaks on the fore border : hind-wings slightly gray. Length of the body 6-8 lines ; of the wings 18-24 lines.

"Var. β . Body ferruginous.

"*a-e*. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

We add :

Head brown above except the area between the antennae and the lateral ocelli, which is black ; there are two bunches of tawny hair immediately behind the antennae and a few tawny bristles behind the ocelli ; face brownish yellow with hair of the same colour ; *antennae* and palpi brownish yellow, the antennae broadly ringed with dark brown ; pronotum dark brown, the warts with long, tawny bristles ; mesonotum brown in the middle with an impressed median line, and with two bristle-bearing warts lying near and parallel to the oblique margins of the brown area ; sides of the mesonotum dark brown to black ; metanotum dark brown ; *legs* brownish yellow, the spines and spurs of the same colour ; *fore wings* orange, densely irrorated with brown ; there are several brown spots, one at the end of the discal cell covering the cross-vein r-m, one on the cross-vein m-cu, one at the tip of Cu₁ and the anal veins, and some in cell Cu₁ and along the 1st A ; the wing margin dark at the tips of the apical veins ; *hind wings* clear except for some brown spots along the costal margin in the region of the pterostigma ; by aberration the 2nd branch of the media is forked in the left wing of the specimen described, forming a very minute additional cell ; *abdomen* irregularly brown and yellow above, yellowish beneath, a brown line running transversely across each of the ventral segments nos. 4-7.

Length of the fore wing, male, 21 mm.

Genitalia, male.—Apical margin of the 9th tergite produced at its centre in a rounded lobe ; superior appendages long and slender, each terminating in a pair of long, yellow spines ; between them, the upper penis-cover, which is broad and slopes slightly downward, is divided in two parts ; from the side it is broad, with the apex obliquely truncate ; from each upper angle of the apex arises a bunch of two or three very long, yellow spines, whilst each lower apical angle is produced in a large, upwardly bent prong ; the penis at its apex is furnished with a pair of outwardly and basally curving horns ; inferior appendages, from the side, very broad, apex obliquely truncate, the upper angle produced in a stout, distally directed hook with a slightly blackened apex ; from above, these hooks incline towards each other ; ventral margin of the 9th segment strongly toothed, the margin continuing in a nearly circular manner within the abdominal cavity to make a still more acutely toothed back margin ; from the side, the lower part of the segment is produced considerably beyond the upper, with the lower margin forming a distally directed tooth.

The foregoing description of the male is based on a specimen in Walker's series of *Neuronina fusca* (specimens *a-e*), collected by Barnston in the Hudson's Bay region ; the right wings of this specimen are mounted dry in celluloid and the cleared abdomen in balsam. We designate this the type of Walker's *N.*

fusca, and while the basis for doing so is none too satisfactory, we judge it best to continue the practice of identifying the species with *semifasciata* Say.

Walker listed 11 specimens under his description of *Neuronia fusca*; of these we are able to locate 10. Of the 5 specimens (*a-e*) listed from Hudson's Bay, one is the male described above as *N. semifasciata*; there are two other males, one a complete specimen and certainly belonging here, the other without abdomen and hind wings and probably the same; a fourth specimen of this series is a female described below as the type of a new species, *Neuronia dubitans*; the fifth specimen we are unable to locate.

Of the 4 specimens (*f-i*) listed as of Redman's collection from Nova Scotia, one is a male of *Neuronia ocellifera* Walker, and three are females included in *Neuronia simulans* (p. 107) here described as new. The single specimen (*j*) from Newfoundland, presented by Mr. St. John, is a female and is selected by us as the type of our *Neuronia simulans*. Walker's specimen *k*, of unknown origin, is a female of *N. postica*.

Two of the female specimens, one of *N. simulans* (Walker's *f-i*) and one of *N. postica* (Walker's *k*) were presented to Dr. Ulmer in 1907, and these have kindly been lent to us for examination.

The problem of sorting out the species confused by Walker under *fusca*, *ocellifera* and *postica* and of relating other described species to these is a very complex one. We hope to have contributed toward its solution by selecting a male type of *fusca* Walker and confirming its reduction to synonymy under *semifasciata* Say, by describing the male type of *ocellifera* Walker, by selecting and describing a female type of *postica* Walker, and by selecting and describing two other females out of Walker's *fusca* under the names "*dubitans*" and "*simulans*". It is anticipated that the last two names may be reduced to synonymy when the females on which they are based are eventually associated with males.

We have not been able to separate all these forms by colour pattern, and have therefore used characters of the female genitalia, partly internal.

Neuronia dubitans sp. n.

(Fig. 50.)

Phryganea fusca, Barnston MSS.

1852. *Neuronia fusca* Walker, *partim*, Cat. Neur. Brit. Mus. : 9.

Walker describes *Neuronia fusca* as follows :

"*Nigra* ; *antennae ferrugineae* ; *pedes testacei* ; *alae anticae ferrugineae fusco confertim reticulatae maculisque duabus fuscis*.

"Black, clothed with brown hairs : antennae ferruginous : abdomen beneath and legs testaceous : fore-wings ferruginous, thickly reticulated with brown, with a brown spot on the hind border and another in the disk at the base of the intermediate subapical areolets ; a few brown transverse streaks on the fore border : hind-wings slightly gray. Length of the body 6-8 lines ; of the wings 18-24 lines.

"Var. β . Body ferruginous.

"*a-e*. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

To this we add :

The description given above for the type of *fusca*, regarded as equivalent to *semifasciata* Say, will serve for this species also, except that in the type of *dubitans* the mesonotum is wholly black and the metanotum is black in its anterior half.

Being a female, the type of *dubitans* has the additional branches in the media of the fore and hind wings.

Length of the fore wing, female, 22 mm.

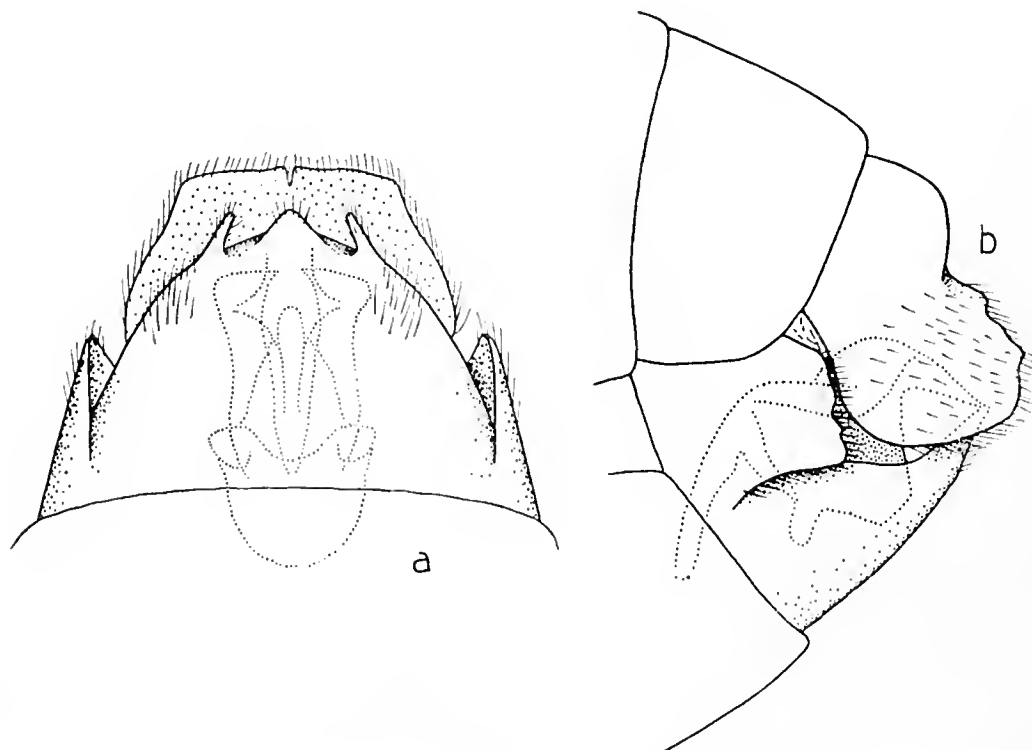


FIG. 50.—*Neuronina dubitans* sp. n. ♀: *a*, genitalia, ventral, *b*, lateral.

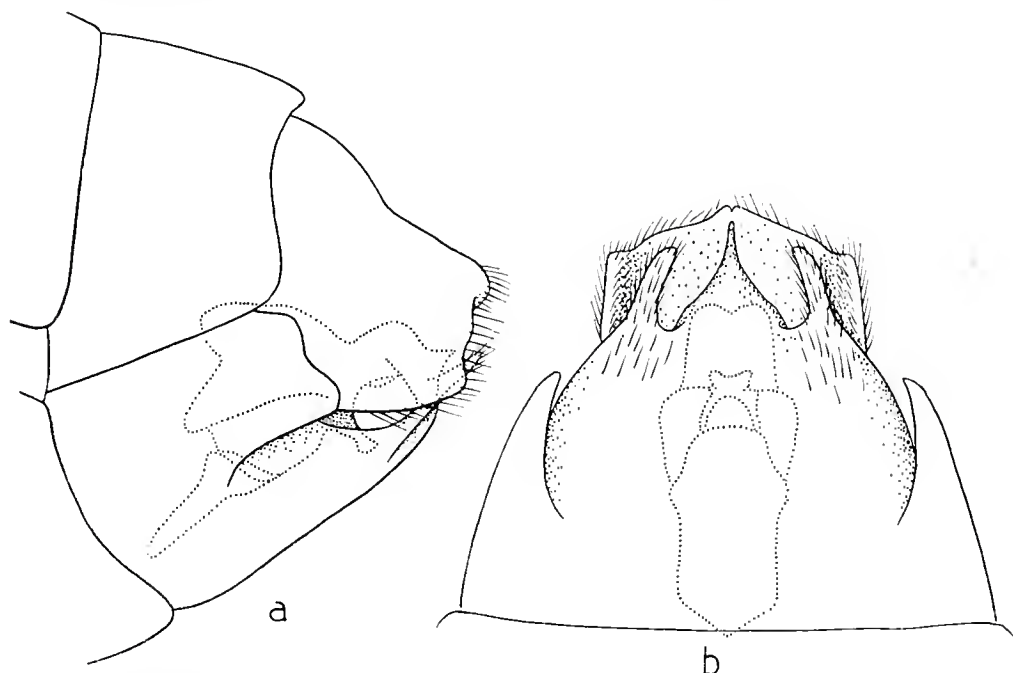
Genitalia, female.—The abdomen terminates in a large dorsal hood ; the apical margin straight with a slight excision at its centre ; beneath it is a trilobed process, outer lobes short and slender, sloping slightly inwards ; middle lobe wide, apex not produced. There is an internal structure connected with the vagina which is here figured but not verbally described. This structure affords a distinguishing character between *dubitans* and *simulans*.

The type of the species is one of Walker's series of *fusca* (*a-e*) collected in the Hudson's Bay region.

We differentiate it from the other species of this closely allied group only by the genitalia, and we cannot state with what male it is to be associated.

Neuronia simulans sp. n.

(Figs. 51-55.)

Phryganea fusca Barnston MSS.1852. *Neuronia fusca* Walker, *partim*, Cat. Neur. Brit. Mus. : 9.1852. *Neuronia postica* Walker, *partim*, Cat. Neur. Brit. Mus. : 9.1905. *Neuronia ocellifera* Ulmer, Ann. k. k. Naturh. Hofmus. Wien, 20 : 61, figs. 3, 4.1934. *Neuronia ocellifera* Betten, N.Y. State Mus. Bull., 292 : 299, pl. 41, figs. 9-11.FIG. 51.—*Neuronia simulans* sp. n. ♀ (from the type): *a*, genitalia, lateral, *b*, ventral.

Walker's descriptions :

Of *fusca* :

"*Nigra* ; *antennae ferrugineae* ; *pedes testacei* ; *alae anticae ferrugineae fusco confertim reticulatae maculisque duabus fuscis*.

"Black, clothed with brown hairs : *antennae ferruginous* : *abdomen beneath and legs testaceous* : *fore-wings ferruginous, thickly reticulated with brown, with a brown spot on the hind border and another in the disk at the base of the intermediate subapical areolets* ; a few brown transverse streaks on the fore border : *hind-wings slightly gray*. Length of the body 6-8 lines ; of the wings 18-24 lines.

"Var. β . Body ferruginous.

"*f-i*. Nova Scotia. From Lieut. Redman's collection.

"*j*. Newfoundland. Presented by W. E. St. John, Esq."

Of *postica* :

"*Fusca* ; *palpi pedesque testacei* ; *abdomen nigro trivittatum* ; *alae anticae fusco reticulatae, posticae fascia brevi angulata fusca*.

"Ferruginous : palpi and legs testaceous : abdomen with three blackish stripes : fore-wings indistinctly and very minutely reticulated with brown, which colour is

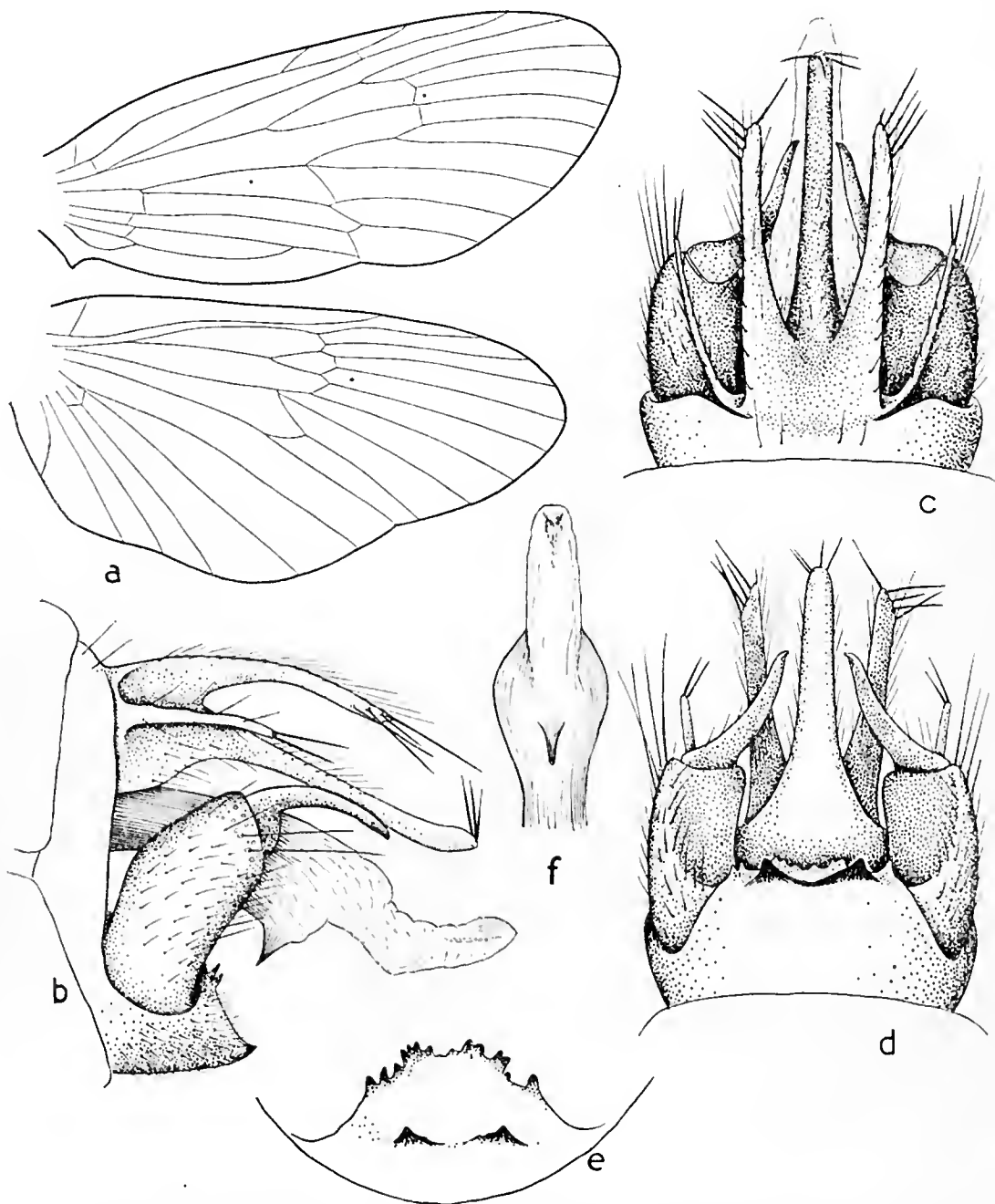


FIG. 52.—*Neuroniu simulans* sp. n. ♂ (from the Betten collection): *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral, penis omitted; *e*, 9th sternite, from behind; *f*, penis, ventral.

most prevalent at the tips : hind-wings paler, with a short angular brown band in the disk towards the tip.

"Length of the body 7 lines ; of the wings 20–22 lines.

"*a*, *b*. Georgia. From Mr. Abbot's collection."

To this we add :

Head brown above, with yellow hair just behind the median ocellus ; posterior warts mostly denuded ; face and palpi yellow ; warts of the prothorax with yellow bristles ; mesonotum brown with anteriorly a median black spot, on either side of which is a longitudinal wart, apparently denuded ; *thorax*

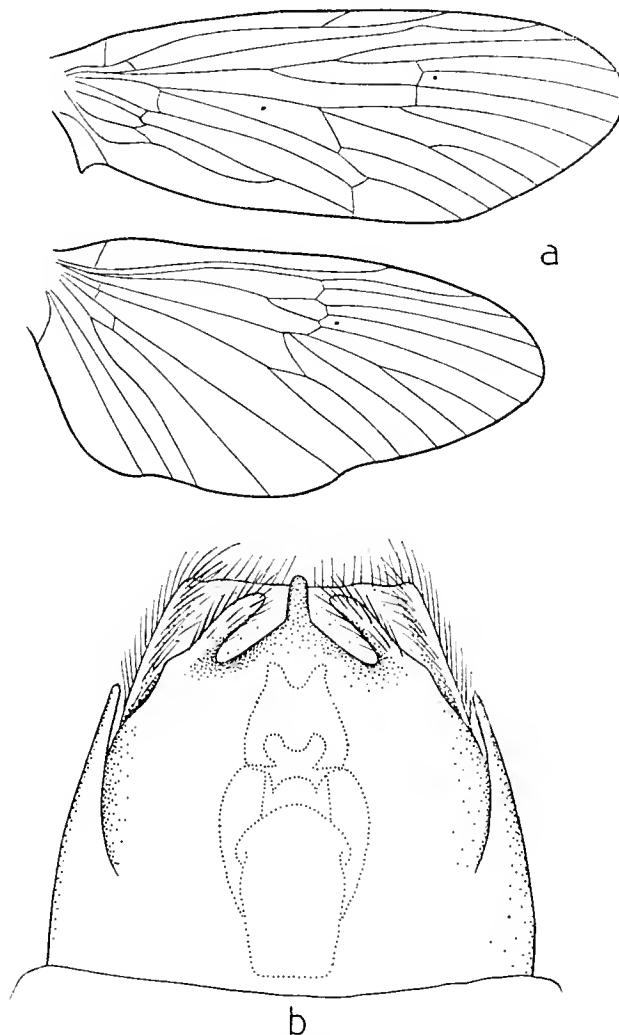


FIG. 53.—*Neuronias simulans* sp. n. ♀ (paratype from Georgia): *a*, wings ; *b*, genitalia, ventral.

beneath and the *legs* yellow, the spines and spurs a little darker ; *fore wings* yellow with fine reticulations of brown ; somewhat larger brown spots at the tips of Sc and R₁, on the cross-vein r-m, at the tip of the anals and along 1st A ; the apex of the wing much narrowed, margined with brown at the tips of the veins ; *hind wings* clear yellow, the anterior margin slightly darker ; a very narrow angulate brown band extends from R₅ to Cu₁.

Length of fore wings, female, 23 mm.

Genitalia, male.—The 9th tergite is produced in five slender processes

arranged as follows : above is a single pair with the apex of each bearing five or six stout spines or bristles ; at a lower level on each side arises a rather more slender and shorter process with its apex also furnished with a few bristles ; in the centre, at a slightly lower level than the 1st pair is a longer process, again

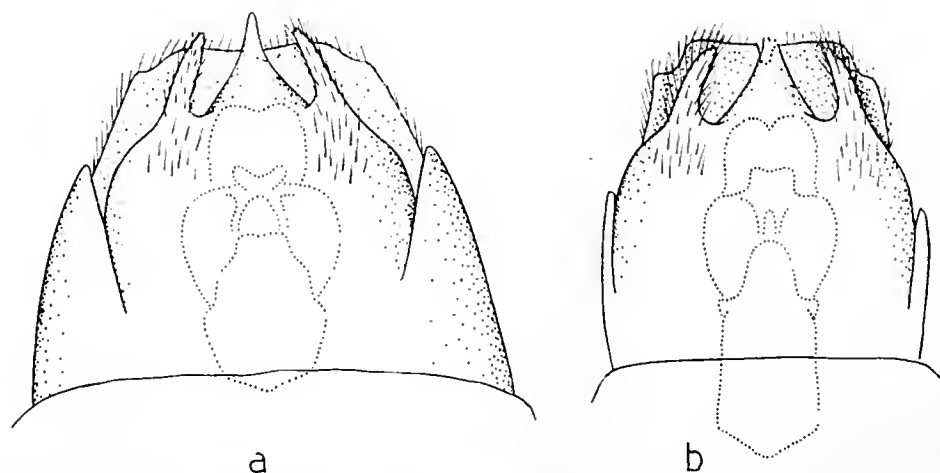


FIG. 54.—*Neuronina simulans* sp. n. ♀ (paratypes from Nova Scotia) : *a*, genitalia, ventral, from one example ; *b*, the same, from a second example.

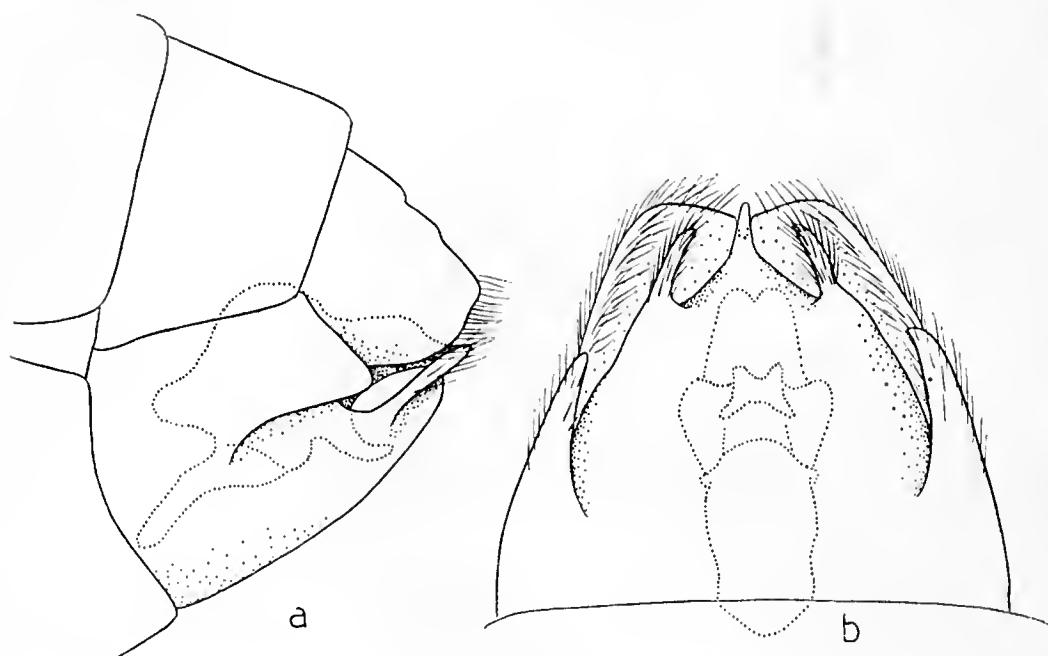


FIG. 55.—*Neuronina simulans* sp. n. ♀ (example from the Betten collection) : *a*, genitalia, lateral, *b*, ventral.

with the apex furnished with bristles ; penis membranous, with a stout spine on its lower surface ; inferior appendages two-jointed, basal joint very stout, apical joint stout at the base, narrowing to a strongly chitinized, distally directed hook ; 9th sternite produced ; from beneath, excised, the apical angles bearing acute spurs or teeth ; from behind it may be seen that the sternite is

very thick, its upper margin being furnished with a serrate row of short teeth.

Genitalia, female.—The abdomen terminates in a dorsal hood, beneath which is a trilobed process; outer lobes long and slender, sloping slightly inward, middle lobe slightly longer than the outer, conical, with the apex produced and slender; there is an internal structure connected with the vagina, somewhat variable in the different examples of the Walker series. As these parts are not familiar to students of the Trichoptera and bear no generally accepted names, we are figuring each specimen in the series without giving any verbal description. These structures appear to afford the only definite characters by which the closely allied species of this group may be separated in the female sex.

We take as the type of this species a female which is Walker's specimen *j* under *fusca*, collected in Newfoundland. We identify as also of this species three of the four specimens (*f-i*) of Walker's *fusca* and one specimen of his *postica*, all females. This has been done on the basis of the genitalia as here figured. The colour pattern of the wings presents a very considerable variation.

A female from the Betten collection, taken at Batavia, New York, is apparently of this species, and since it is associated with a male collected at the same time and place, we include figures of the genitalia of this male, which is the one figured by Betten (1934) as *ocellifera*. Ulmer's species described and figured as *ocellifera* (1905 : 61) appears to be the same.

LIMNOPHILIDAE.

Arctoecia consocia (Walker).

(Fig. 56.)

- 1852. *Limnephilus consocius* Walker, Cat. Neur. Brit. Mus. : 33.
- 1859. *Limnephilus consocius* Hagen, Stett. Ent. Zeit., 20 : 134.
- 1861. *Anabolia consocia* Hagen, Syn. Neur. N. Amer. : 264.
- 1863. *Anabolia consocia* McLachlan, Ent. Ann. : 157.
- 1864. *Goniotauius consocius* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 815.
- 1864. *Stenophylax consocius* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 835.
- 1892. *Anabolia consocia* Banks, Trans. Amer. Ent. Soc., 19 : 363.
- 1905. *Colpotaulius medialis* Banks, Trans. Amer. Ent. Soc., 32 : 8, pl. 1, fig. 3.
- 1907. *Arctoecia consocia* Ulmer, Genera Insect., fasc. 60a : 47, pl. 4, fig. 24.
- 1907. *Arctoecia medialis* Ulmer, Genera Insect., fasc. 60a : 47.
- 1907. *Colpotaulius consocia* Banks, Cat. Neur. Ins. U.S. : 37.
- 1907. *Colpotaulius medialis* Banks, Cat. Neur. Ins. U.S. : 37.
- 1923. *Arctoecia consocia* Banks, U.S. Dept. Agr. Biol. Surv., N. Amer. Faun., no. 46 : 146.
- 1926. *Arctoecia consocia* Sibley, Bull. Lloyd Lib., no. 27, Ent. Ser., 5 : 107.
- 1934. *Arctoecia consocia* Betten, N.Y. State Mus. Bull., 292 : 314, pl. 43, figs. 4-8; pl. 44, fig. 1 (*medialis* reduced to synonymy).
- 1935. *Arctoecia consocia* Milne, St. N. Amer. Trieh., 2 : 39, 49.
- 1938. *Limnephilus medialis* Ross, Psyche, 45 : 36 (types of *medialis* designated).

Walker describes the species as follows :

"*Ferrugineus* ; *thorax nigro vittatus* ; *abdomen supra nigricans* ; *pedes testacei* ; *alae anticae testaceae, albido confertissime irroratae* ; *alae posticae subhyalinae*.

"Ferruginous, clothed with pale hairs : antennae black at the base : thorax with a broad black stripe : abdomen blackish above : legs testaceous : fore-wings testaceous, with very numerous whitish dots, many of which are confluent ; veins brown : hind-wings almost colourless. Length of the body 4 lines : of the wings 12 lines.

"*a.* North America. Presented by the Entomological Club."

To this we add :

Head and *prothorax* wanting ; mesonotum and metanotum yellowish brown, the mesonotum with a dark brown median stripe ; *middle* and *hind legs* yellow, with yellow spurs and black spines ; *fore wings* with slightly excavate postapical margin, in general of a brownish colour, with numerous pale dots on a darker background, costal margin mostly clear, veins reddish, interrupted somewhat by the pale dots ; *abdomen* brown above, paler beneath.

Length of the fore wing, male, 13 mm.

Genitalia, male.—Apical margin of the 9th tergite, concealed beneath the 8th, is furnished at its centre with a very small rounded and fringed dorsal plate and with a pair of minute, membranous, finger-like processes beneath it and at its side ; superior appendages very large ; from the side, broadened considerably at their obliquely truncate and blackened apical margins, with the upper angles produced and slightly inturned ; intermediate appendages laterally broad, apical margins thickened and blackened ; in a cleared preparation, seen from the side, there is an indication of a rounded upper penis-cover with a membranous triangular structure above it ; the cover is almost entirely concealed from the side, but visible as a strongly chitinized bridge or bar from beneath ; penis cylindrical, slightly constricted before the apex ; sheaths membranous, apices simple but heavily fringed with yellow bristles ; inferior appendages broad at the base, produced abruptly at the slender apices, whose apical margins are excised with rounded excisions ; there are ventral processes to almost every segment excepting the 8th, that of the 7th being the largest, the others diminishing in size towards the base of the abdomen ; they are all situated on false sutures at the middle of the segments.

The type material consists of the single male specimen.

While we list this species in *Arctoecia*, we question whether it might not be as well placed in *Phacopteryx*. Using *Arctoecia concentrica* Zett. and *Phacopteryx brevipennis* Curt. for comparison with *consocia*, we find that these three are closely similar in the proportionate length of joints of the palpi, and of the tarsi, and also in venation ; in all three the membrane of the fore wing is granulose, most so in *brevipennis*, least so in *consocia* ; all have an emargination in the hind wing, most pronounced in *consocia*, and in all of them the margin of the fore wing is indented at the tips of the veins. In the shape of the fore wing *consocia* and *brevipennis* are most alike in that the wing length is nearly three times the greatest width ; in *concentrica* it is not much more than twice the width.

On the other hand, *consocia* and *concentrica* agree in lacking the black hairs on the fore wings, particularly on the veins, that occur in *brevipennis*. *Consocia* differs from the other two in having the postapical margin of the fore wing slightly concave instead of convex, in having a black band extending over the head and thorax, and in having processes developed on the ventral abdominal segments. In the structure of the male genitalia, *consocia* conforms more closely with *brevipennis* than *concentrica*.

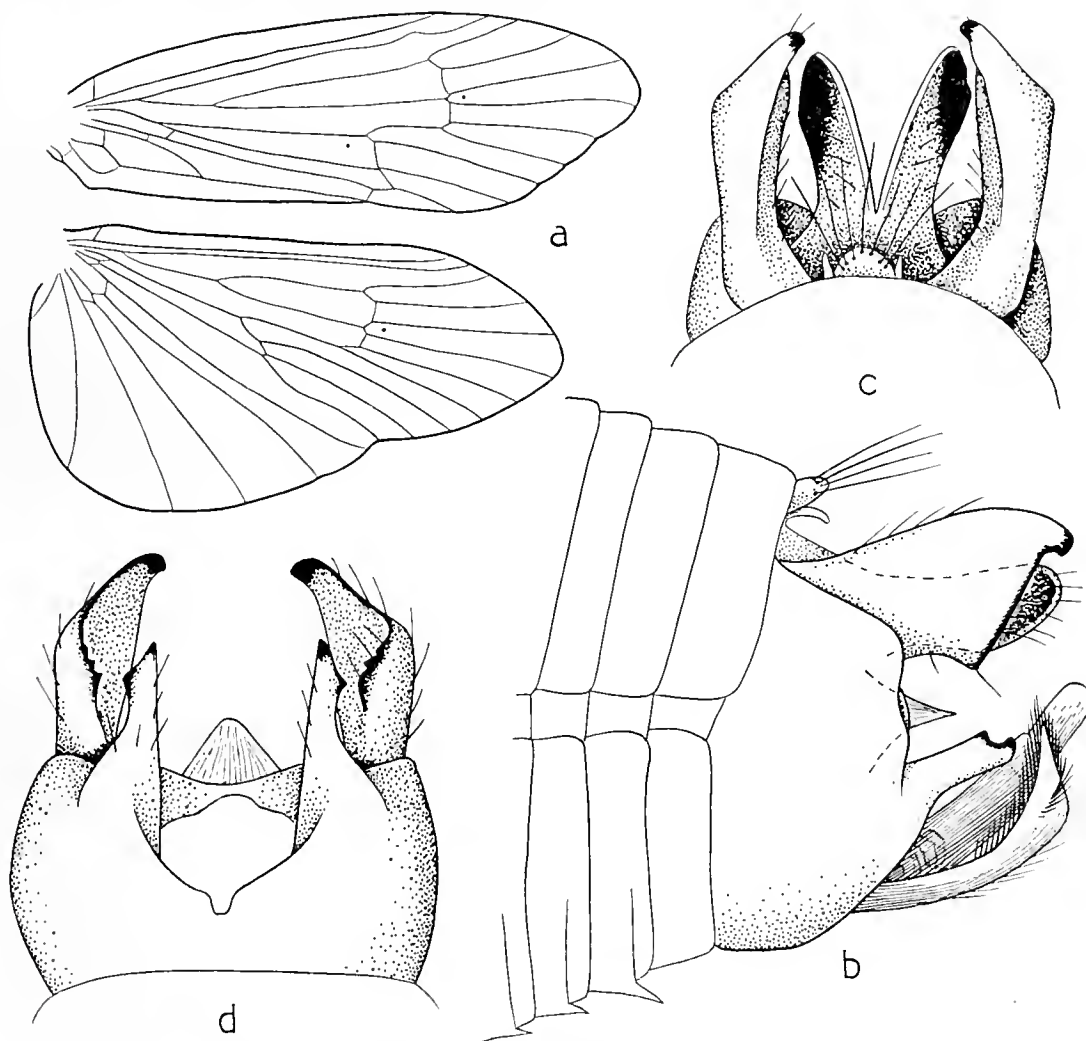


FIG. 56.—*Arctoecia consocia* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral, penis and sheaths omitted.

McLachlan, in the generic description of *Arctoecia*, says that the female is much smaller than the male, that the apex of the fore wing is broadly parabolic in the male, angular and subacute in the female, and that in the female, the margin below the apex is slightly excised. In *consocia* there is considerable range in size in both males and females, but the males are not generally larger than the females; also in this species, the slight excision of the wing margin is found in both sexes.

Caborius punctatissimus (Walker).

(Fig. 57.)

1852. *Halesus punctatissimus* Walker, Cat. Neur. Brit. Mus. : 17.
 1859. *Halesus punctatissimus* Hagen, Stett. Ent. Zeit., **20** : 134.
 1861. *Anabolia punctatissima* Hagen, Syn. Neur. N. Amer. : 264.
 1863. *Anabolia punctatissima* McLachlan, Ent. Ann. : 161.
 1864. *Stenophylax punctatissimus* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 885.
 1871. *Stenophylax punctatissimus* McLachlan, Journ. Linn. Soc. Lond., Zool., **11** : 109.
 1892. *Stenophylax punctatissimus* Banks, Trans. Amer. Ent. Soc., **19** : 364.
 1900. *Asynarchus punctatissimus* Banks, Proc. Ac. Sci. Wash., **2** : 469, pl. 27, fig. 6.
 1907. *Asynarchus punctatissimus* Ulmer, Cat. Coll. Selys, fasc. **6**, pt. 1 : 22, figs. 36-39, pl. 2, fig. 7.
 1907. *Allophylax punctatissimus* Banks, Proc. Ent. Soc. Wash., **8** : 119.
 1907. *Allophylax punctatissimus* Ulmer, Genera Insect., fasc. **60a** : 52, pl. 4, fig. 29.
 1907. *Allophylax punctatissimus* Banks, Cat. Neur. Ins. U.S. : 39.
 1918. *Caborius punctatissimus* Navás, Mem. Ac. Sci. Barc., **14** : 362.
 1926. *Allophylax punctatissimus* Sibley, Bull. Lloyd Libr., no. 27, Ent. Ser., **5** : 105.
 1934. *Carboryus punctatissimus* Betten, N.Y. State Mus. Bull., **292** : 318, pl. 45, fig. 2.
 1935. *Carboryus punctatissimus* Milne, St. N. Amer. Trich., **2** : 25, 50.
 1938. *Carboryus punctatissimus* Ross, Illinois Nat. Hist. Surv. Bull., **21** : 163, fig. 101.

Walker describes the species as follows :

"*Testaceus ; alae anticae albido indistincte et confertissime irroratae ; alae posticae albidae.*

"Testaceous, rather broad : antennae stout : fore-wings broad, minutely tuberculate, very thickly covered with whitish dots ; fore-border mostly whitish ; a large irregular whitish spot on the discal areolet, on the areolet of the thyridium, and on the cell of the thyridium : hind-wings whitish. Length of the body $3\frac{1}{2}$ lines ; of the wings 12 lines.

"*a, b.* Nova Scotia. From Lieut. Redman's collection."

To this we add :

Head yellowish brown above, the posterior margin yellow, sparsely covered with brown hair ; ocelli whitish ; *antennae* stout, yellowish brown, the basal joint as long as the head, covered with black hair ; the 2nd joint very short, the succeeding joints with short, black hair ; palpi yellowish brown, covered with short hair slightly darker in colour ; the margin of the *head* beneath the eyes is drawn out into a process longer and more slender than is common ; *thorax* yellowish brown ; prothorax and tegulae with stout brown hair, mesonotum practically nude ; on each side of the median line a narrow, longitudinal area with depressed margin ; *legs* yellow, with reddish spurs and black spines ; *fore wings* finely tuberculate, the membrane brown, with many whitish dots which are somewhat confluent and form very indistinct white patches ; wings covered with fine, short, black hair, the costal fringe yellow and some yellow hairs also along the subcosta and R_1 ; *hind wings* transparent, with a yellow tinge ; a fringe of short yellow hair, the wing membrane finely tuberculate ; *abdomen* yellow, with irregular black markings.

Length of the fore wing, male, 15 mm.

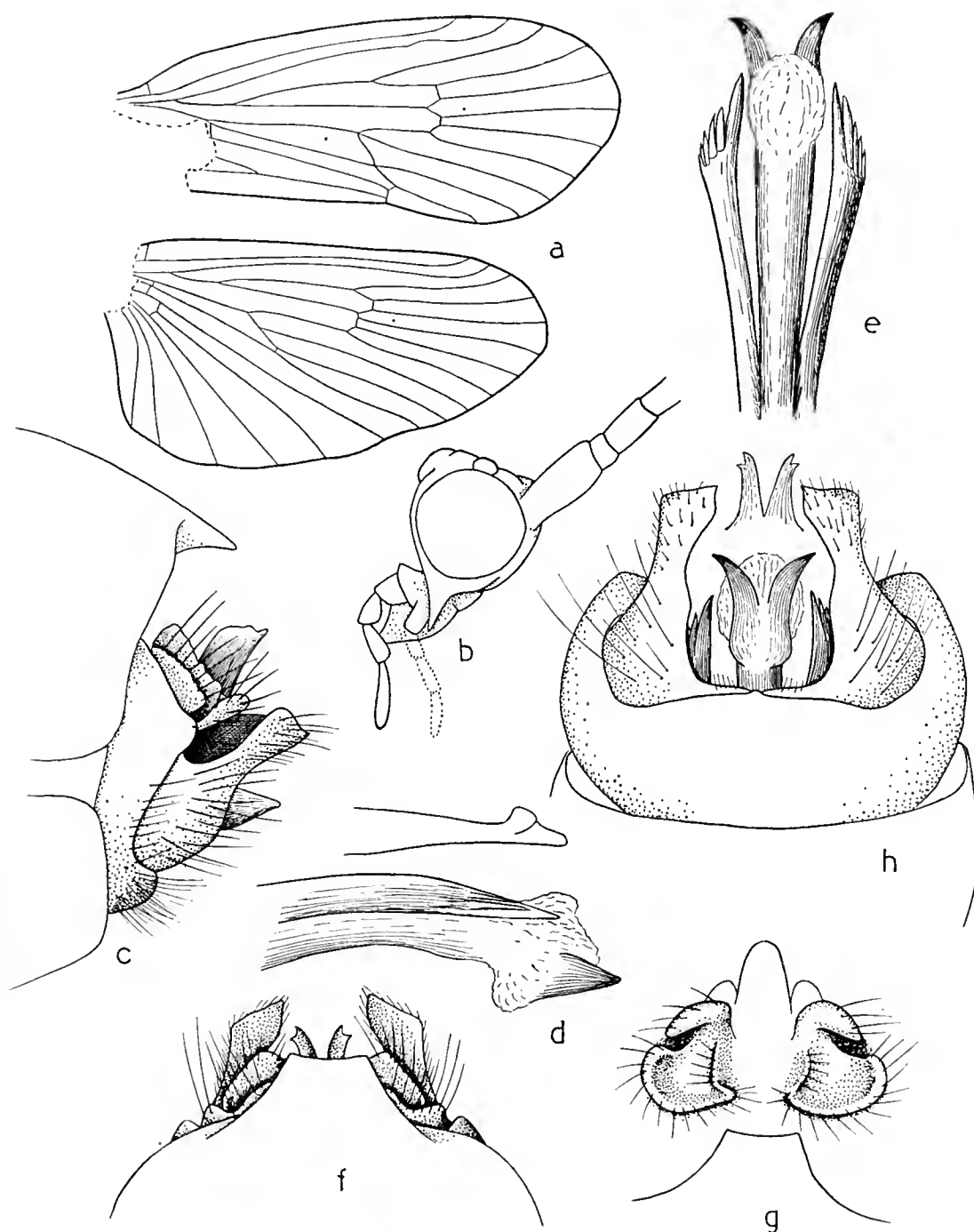


FIG. 57.—*Caborius punctatissimus* Walk. ♂: *a*, wings; *b*, head, etc.; *c*, genitalia, lateral; *d*, penis, upper penis-cover, etc., lateral, *e*, the same, dorsal; *f*, genitalia, dorsal; *g*, superior appendages, upper penis-cover, margin of the 8th tergite, from above and behind; *h*, inferior appendages, penis and sheaths, intermediate appendages, from beneath and behind.

Genitalia, male.—Apical margin of the 8th tergite strongly produced with a truncate or slightly concave margin to the produced part ; superior appendages fringed, small, wide and foliated ; intermediate appendages situated centrally amongst the genitalia, plate-like, strongly chitinized and directed upward ; from above, with the apices slightly diverging and excised ; from the side, broad, apex oblique ; upper penis-cover membranous and trilobed, the central lobe about twice the length of the outer lobes ; penis with a pair of divergent claws at its apex ; sheaths straight, with the apices dilated and furnished on the outer margin with long, strong, yellow teeth ; inferior appendages, from the side, constricted at the centre with dilated, truncate apices ; no ventral processes.

We have selected as the type the specimen labelled as of Redman's collection from Nova Scotia. The second male example of the same collection agrees with the type except that there are small differences in the position and shape of the indistinct white patches on the fore wings.

***Limnophilus despectus* Walker.**

(Figs. 58, 59.)

Phryganea variegata Barnston MSS.

- 1852. *Limnophilus despectus* Walker, Cat. Neur. Brit. Mus. : 31.
- 1852. *Limnophilus multifarius* Walker, Cat. Neur. Brit. Mus. : 32.
- 1852. *Limnophilus perforatus* Walker, *partim*, Cat. Neur. Brit. Mus. : 33.
- 1861. *Limnophilus despectus* Hagen, Syn. Neur. N. Amer. : 259.
- 1861. *Limnophilus multifarius* Hagen, Syn. Neur. N. Amer. : 259 (*perforatus partim*, reduced to synonymy under *multifarius*).
- 1863. *Limnophilus despectus* McLachlan, Ent. Ann. : 157 (*multifarius* and *perforatus partim* reduced to synonymy under *despectus*).
- 1864. *Goniotaulius despectus* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 815.
- 1875. *Limnophilus despectus* McLachlan, Rev. and Syn. Trich. : 90, pl. 10, figs. 1-5.
- 1876. *Limnophilus despectus* McLachlan, Rev. and Syn. Trich., Suppl. : vii, pl. 27.
- 1892. *Goniotaulius despectus* Banks, Trans. Amer. Ent. Soc., **19** : 363.
- 1907. *Limnophilus despectus* Ulmer, Genera Insect., fasc. **60a** : 43.
- 1907. *Limnophilus despectus* Banks, Cat. Neur. Ins. U.S. : 36.
- 1908. *Limnophilus despectus* Banks, Trans. Amer. Ent. Soc., **34** : 267, pl. 18, fig. 5.
- 1908. *Limnophilus despectus* Banks, Psyche, **15** : 63.
- 1914. *Limnophilus despectus* Martynov, Ann. Mus. Zool. Ac. Sci., St. Petersburg., **19** : 191.
- 1934. *Limnophilus despectus* Betten, N.Y. State Mus. Bull., **292** : 321, pl. 45, fig. 3.
- 1934. *Limnophilus eminens* Betten, N.Y. State Mus. Bull., **292** : 323, pl. 45, fig. 4.
- 1935. *Limnophilus despectus* Milne, St. N. Amer. Trich., **2** : 46, 51.
- 1935. *Limnophilus despectus* Martynov, Trav. Inst. Zool. Acad. Sci. U.S.S.R. : 352, 353.

Walker describes the species under three distinct names as follows :

L. despectus.

“*Cinereo-ferrugineus ; antennae subfuscae, articulis basi abdomine pedibusque testaceis ; thorax albo bivittatus ; alae anticae fuscae albido irroratae et bimaculatae, costa discoque apicem versus albidis.*

“ Dark ferruginous, tinged with gray, clothed with pale hairs and beset with

longer black bristles : antennae pale brown ; joints testaceous at the base : maxillary palpi brown : labial palpi, abdomen and legs testaceous : thorax with two white stripes : fore-wings brown, with whitish dots, and a whitish spot on the cell of the thyridium and on the interclaval areolet, and another on the 1st subapical areolet ; the whitish colour also prevails along the fore border and on the disk towards the tip : hind-wings whitish. Length of the body $3\frac{1}{2}$ lines ; of the wings 10 lines.

"a-c. Nova Scotia. From Lieut. Redman's collection.

"This may be *L. nebulosus*, Kirby, but does not well agree with the description."

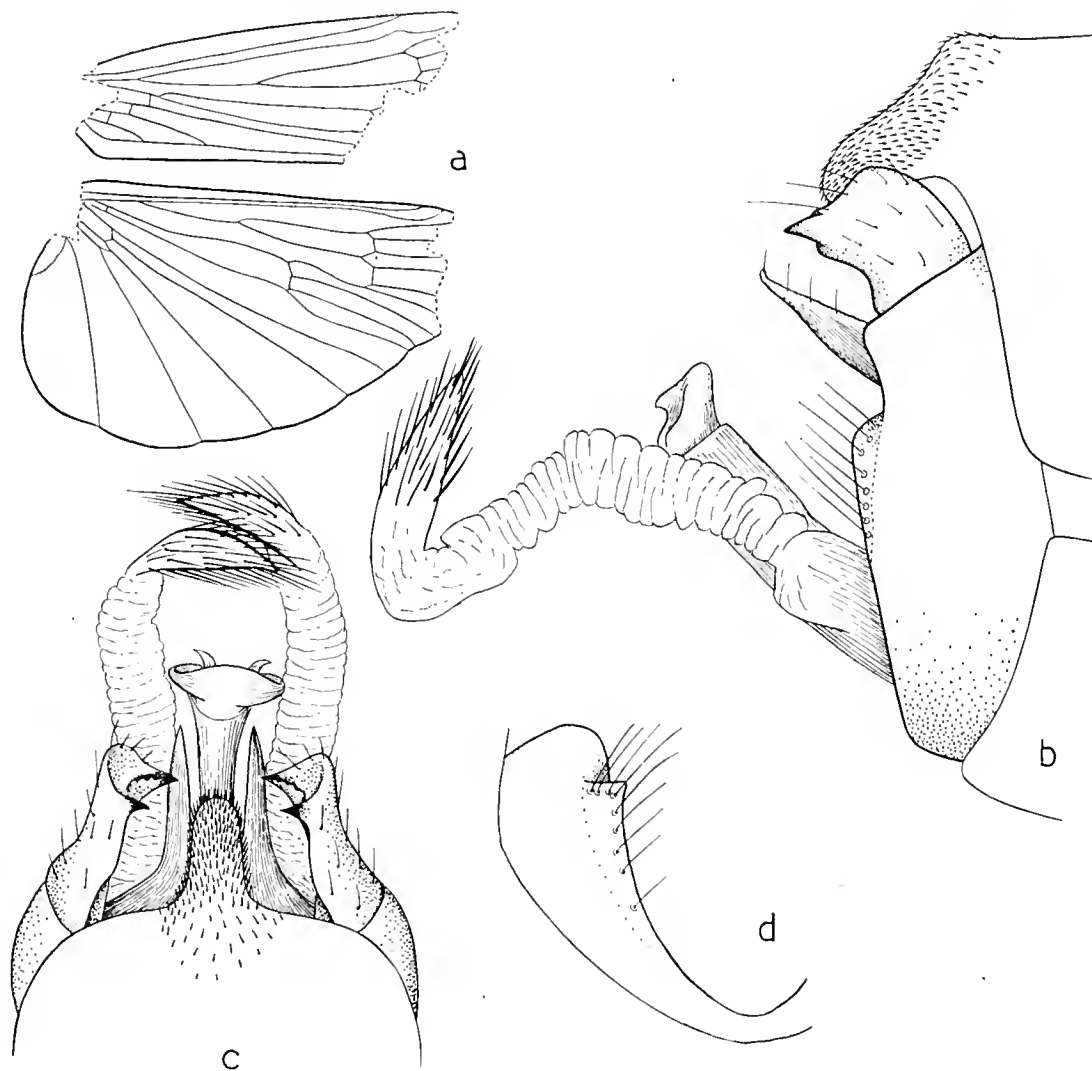


FIG. 58.—*Limnophilus despectus* Walk. ♂ : a, wings ; b, genitalia, lateral, c, dorsal ; d, portion of the margin of the 9th sternite, showing supposed fused inferior appendage.

L. multifarius.

"Nigro-cinereus ; antennae fuscae, annulatae ; pedes testacei ; alae anticae fuscae, albido irroratae et bimaculatae.

"Black, tinged with gray, clothed with pale hairs and with longer black hairs : antennae brown, testaceous at the base of each joint : legs testaceous : fore-wings brown, with numerous whitish dots, some of which are large and irregular ; a whitish

spot on the areolet and on the cell of the thyridium, and another on the base of the apical areolets; hind border fringed with black hairs; hind-wings grayish. Length of the body $3\frac{3}{4}$ lines; of the wings 10 lines.

"a. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

"Much resembles *L. fenestralis*."

L. perforatus.

"*Ferrugineus*; *caput, thorax vittis duabus et scutellum nigra*; *alae anticae fuscae, albido irroratae et maculatae.*

"Ferruginous, clothed with black hairs: head above, sides of the thorax and scutellum black; legs testaceous: fore-wings brown, with numerous whitish dots; fore border mostly whitish; a rather large whitish spot on the areolet and on the cell of the thyridium, and another occupying the base of the apical areolets: hind-wings slightly gray. Length of the body $3\frac{1}{2}$ lines; of the wings 12 lines.

"a. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

To this we add:

Head above brown, paler in the angle between the antennae and the eyes, with some short white hairs and longer black bristles; ocelli yellowish, not prominent, face brown, with mostly black hair; a pale spot beneath each antenna; basal joint of the *antennae* as long as the head, brown, with black and some white hair, the succeeding joints with broad brown and narrower pale annulations; palpi brown; pronotum brown, with black bristles; mesonotum dark brown at the sides, with whitish median stripes, these covered with black hair, tegulae also with black hairs; *thorax* brown below, with some long white hairs; *legs* and spurs yellow, the tibiae and tarsi with black spines; *fore wing* brown, with white markings and covered with short black and white hair and having longer black bristles on the veins, the costal margin clear, pterostigma dark, enclosed in a large, clear area which extends from M_2 to the costal margin; a somewhat oblique white area extends from Cu_1 to the discal cell, along R_1 , Cu_1 , and also along the posterior margin there is a succession of light and dark spots; the apices of the fore wings are lacking; two female specimens show the apex brown with scattered white dots, and a triangular white area in cell M_2 at the wing margin; *abdomen* light brown.

Length of the fore wing, male 9, mm.; female, 10 mm.

Genitalia, male.—Apical margin of the 8th tergite is produced in a large, overhanging tongue, covered with short, black setae; superior appendages, from the side, more or less quadrate with an internal ridge bearing black teeth at each extremity, the teeth at the lower end being more numerous and more produced than those at the upper end; intermediate appendages, from the side, in the form of a narrow, triangular plate, upper margin slightly serrate; penis cylindrical with a collar before the apex; the apex expands in a pair of fan-like leaves, each with a small, down-turned hook on its outer surface; there is a pair of membranous penis-sheaths, apices heavily fringed with yellow bristles; no ventral teeth. We are unable to make out the inferior appendages

to which McLachlan refers (*Rev. and Syn. Trich.*, 1875 : 90), but the thickened and inturned edge of the 9th segment may indicate that the appendages are fused and vestigial.

Genitalia, female.—The 9th tergite triangular and produced in a pair of

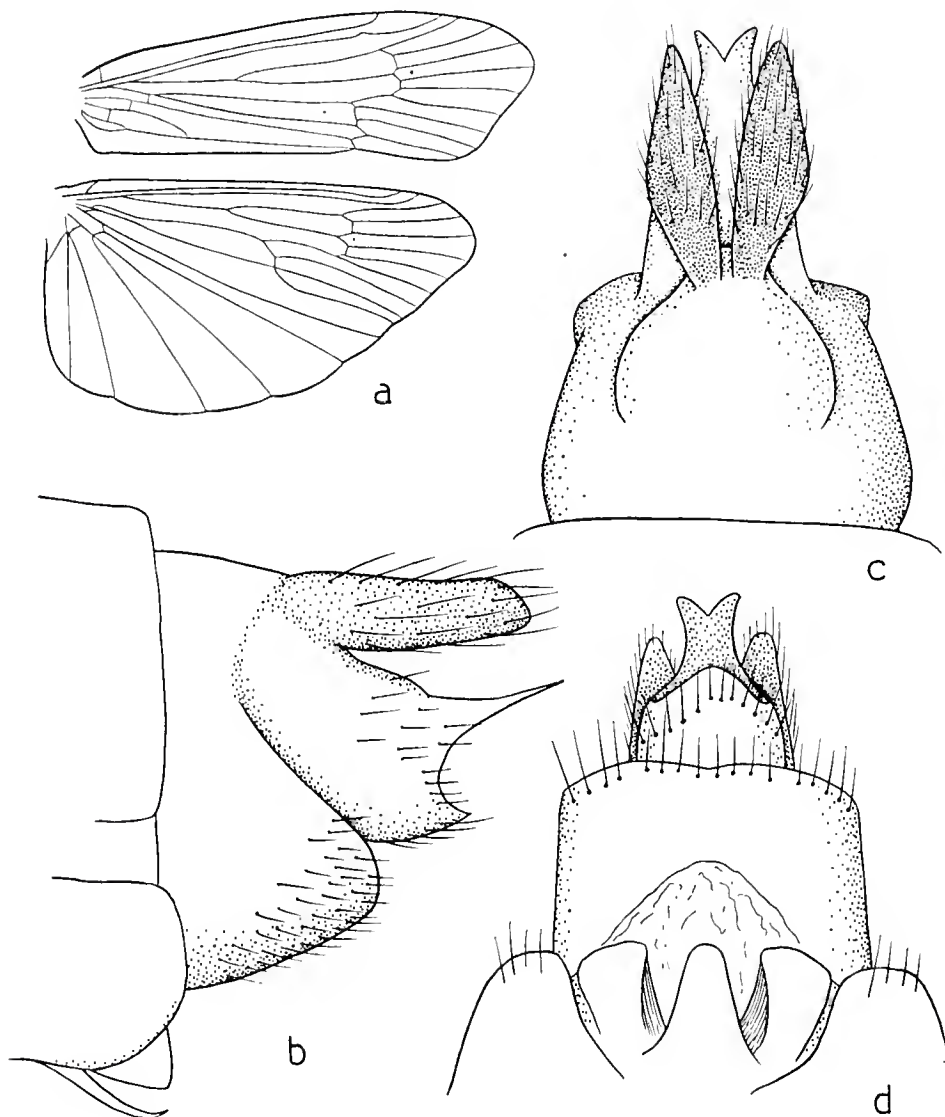


FIG. 59.—*Limnophilus despectus* Walk. ♀: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

fingers dilated at their centres, apices acute; the tubular piece, from the side is very obliquely truncate, with the upper apical margin deeply excised and visible from above between the pair of dilated fingers; from the side this margin is produced in a long spine, separated from the lower margin by a circular excision; central lobe of the vulvar scale about the same length as the side-lobes, appearing from the side as a sinuous spine.

We designate as the type of the species the male from Nova Scotia in which

the abdomen is present; there are, in addition, a male without abdomen and a female, also collected in Nova Scotia by Lieut. Redman. We have compared this female with the type of *L. perforatus* W. (specimen *a*), also a female, from Hudson's Bay, and the female type of *L. multifarius* W. from the same region, and we confirm the judgment of Hagen and McLachlan that they all belong to the same species — *despectus*. Our figures of the female genitalia are in fact drawn from the type of *multifarius*.

A comparison of specimens from the continent of Europe with the type of *despectus* and with examples of *L. eminens* Betten reveals no differences of any consequence, so that the latter name must be considered a synonym.

***Limnophilus plaga* Walker.**

(Fig. 60.)

- 1852. *Limnophilus plaga* Walker, Cat. Neur. Brit. Mus. : 35.
- 1861. *Limnophilus plaga* Hagen, Syn. Neur. N. Amer. : 263.
- 1863. *Limnophilus plaga* McLachlan, Ent. Ann. : 157.
- 1864. *Goniotauius plaga* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 816.
- 1877. *Limnophilus plaga* Provancher, Le Nat. Can., 9 : 244.
- 1878. *Limnophilus plaga* Provancher, Petite Faun. Ent. Can., 2 : 132.
- 1892. *Goniotauius plaga* Banks, Trans. Amer. Ent. Soc., 19 : 363 (listed doubtfully as a synonym of *despectus*).
- 1907. *Limnophilus plaga* Ulmer, Genera Insect., fasc. 60a : 44.
- 1907. *Limnophilus plaga* Banks, Cat. Neur. Ins. U.S. : 37.
- 1934. *Limnophilus plaga* Betten, N.Y. State Mus. Bull., 292 : 330.
- 1935. *Limnophilus plaga* Milne, St. N. Amer. Trich., 2 : 51 (listed incorrectly as a synonym of *despectus*).

Walker describes the species as follows :

"*Testaceus ; alae anticae macula magna postica media subquadrata fusca, apice fusco subreticulatae.*

"Testaceous, clothed with pale hairs and with a few longer black hairs : forewings with pale shining testaceous down, adorned with a large dark brown subquadrate spot near the hind border, a little beyond the middle ; tips indistinctly reticulated, with two patches of brown. Length of the body $3\frac{1}{2}$ lines ; of the wings 10 lines.

"*a. Nova Scotia. From Lieut. Redman's collection.*"

To this we add :

Head above brown, white along the margins of the eyes, covered sparsely with short, white hair and with a few black bristles ; ocelli not prominent ; face yellow, a brown patch near each eye covered with black bristles ; *antennae* yellow, the basal joint with white hair, the succeeding joints broadly ringed with black hair ; palpi brownish yellow ; pronotum brown, with white hair and longer black bristles ; mesonotum dark brown, a longitudinal row of black bristles on each side of the median line anteriorly ; tegulae brown, with black bristles ; *legs* and spurs yellow, the tibiae and tarsi with black spines ; *fore wings* of a very light cream colour, lightest in the anterior half before the anastomosis ; a very conspicuous brown area lies across cells R and M just

before the base of cell M_2 , with a few lighter dots within it; there are also some brown irrorations just before the anal angle and some fainter ones at the apex of the wing; there are black bristles on the veins, those on the anal veins longer than the others; the wing membrane is densely covered with very short hair black on the brown areas, and white elsewhere.

Length of the fore wing, female, 10 mm.

The type is a female without abdomen. An abdomen which we found separately attached to the pin is with scarcely a doubt from a specimen of *L. despectus*, originally in the same drawer and lacking this part. We judge it extremely unlikely that it should belong to a specimen as different from *despectus* as is the type of *plaga*, with which we found it associated.

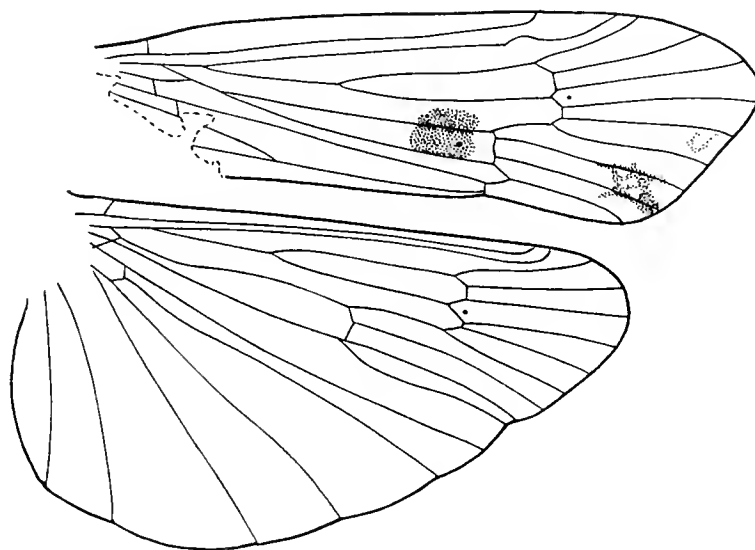


FIG. 60.—*Limnophilus plaga* Walk. ♀: wings.

McLachlan (1863) quoted Hagen to the effect that he (Hagen) regarded the type specimen of *plaga* as "probably recently developed, and perhaps *despectus*". We do not judge the specimen to have been freshly emerged when collected; the heavy pubescence of the wings would seem to differentiate it not only from *despectus*, but from other species of the genus *Limnophilus*.

***Limnophilus nebulosus* Kirby.**

(Figs. 61–63.)

- 1837. *Limnophilus nebulosus* Kirby, Faun. Boreali Amer., 253.
- 1837. *Limnophilus femoralis* Kirby, Faun. Boreali Amer. : 253.
- 1852. *Limnophilus stipatus* Walker, Cat. Neur. Brit. Mus. : 29.
- 1852. *Limnophilus perforatus* Walker, *partim*, Cat. Neur. Brit. Mus. : 33.
- 1852. *Limnophilus nebulosus* Walker, Cat. Neur. Brit. Mus. : 50.
- 1852. *Limnophilus femoralis* Walker, Cat. Neur. Brit. Mus. : 50.

1861. *Limnophilus nebulosus* Hagen, Syn. Neur. N. Amer. : 259.
 1861. *Limnophilus femoralis* Hagen, Syn. Neur. N. Amer. : 259.
 1861. *Limnophilus subpunctulatus* Hagen nec Zett., Syn. Neur. N. Amer. : 261.
 1863. *Limnophilus nebulosus* McLachlan, Ent. Annual : 157 (*stipatus*, *subpunctulatus* and *perforatus partim* reduced to synonymy).
 1864. *Goniotautilus femoralis* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 815, 835.
 1864. *Goniotautilus nebulosus* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 816.
 1875. *Limnophilus nebulosus* McLachlan, Rev. and Syn. Trich. : 71, pl. 10, figs. 1-5.
 1875. *Limnophilus femoralis* McLachlan, Rev. and Syn. Trich. : 72.
 1877. *Limnophilus stipatus* Provancher, Le Nat. Can., **9** : 244.
 1878. *Limnophilus stipatus* Provancher, Petite Faun. Ent. Can., **2** : 132.
 1892. *Limnephilus femoralis* Banks, Trans. Amer. Ent. Soc., **19** : 363.
 1892. *Goniotautilus femoralis* Banks, Trans. Amer. Ent. Soc., **19** : 363.
 1892. *Goniotautilus nebulosus* Banks, Trans. Amer. Ent. Soc., **19** : 363.
 1900. *Limnephilus nebulosus* Banks, Proc. Acad. Sci. Wash., **2** : 469, pl. 28, fig. 12.
 1907. *Limnophilus nebulosus* Ulmer, Genera Insect., fasc. **60a** : 42.
 1907. *Limnephilus nebulosus* Banks, Cat. Neur. Ins. U.S. : 36.
 1908. *Limnephilus nebulosus* Banks, Trans. Amer. Ent. Soc., **34** : 267, pl. 18, fig. 9.
 1934. *Limnephilus femoralis* Betten, N.Y. State Mus. Bull., **292** : 324.
 1934. *Limnephilus nebulosus* Betten, N.Y. State Mus. Bull., **292** : 327.
 1935. *Limnephilus nebulosus* Milne, St. N. Amer. Trich., **2** : 46, 51.

Kirby's description of *L. nebulosus* runs :

“ *Limnephilus nebulosus*. Clouded *Limnephilus*.

“ *L. (nebulosus) niger* ; *alis superioribus testaceis, albido maculatis irroratisque, area costati immaculata* ; *inferioribus albidis* ; *neuris testaceis*.

“ Clouded *Limnephilus*, black with the upper wings dusky-testaceous and dotted with white, the costal area being without spots ; under wings whitish with testaceous nervures.

“ A single specimen taken in Lat. 65. Length of the body 7 lines.

“ DESCRIPTION.

“ Body black, hairy with whitish hairs. Antennae are mutilated in the specimen, but the base is black ; scutellum testaceous : upper wings testaceous, spotted and dotted with white except the costal area, which is without any of that colour ; under wings white with testaceous nervures : legs testaceous.”

Kirby's description of *L. femoralis* is :

“ *Limnephilus femoralis*. Femoral *Limnephilus*.

“ *L. (femoralis) niger, alis superioribus dilute testaceis albo maculatis irroratisque ; inferioribus albis neuris testaceis* : *pedibus testaceis femoribus nigris*.

“ Femoral *Limnephilus*, black, with the upper wings pale testaceous, spotted and dotted with white ; under wings white with testaceous nervures ; legs testaceous with black thighs.

“ Length of the body $6\frac{1}{2}$ lines.

“ Taken with the preceding.

“ DESCRIPTION.

“ Very like the preceding species, but paler, with black scutellum and thighs.”

Walker describes the species under the name *L. perforatus*, as follows :

"*Ferrugineus ; caput, thorax vittis duabus et scutellum nigra ; alae anticae fuscae, albido irroratae et maculatae.*

"Ferruginous, clothed with black hairs : head above, sides of the thorax and scutellum black : legs testaceous ; fore-wings brown, with numerous whitish dots ; fore border mostly whitish ; a rather large whitish spot on the areolet and on the cell of the thyridium, and another occupying the base of the apical areolets : hind-wings slightly gray. Length of the body $3\frac{1}{2}$ lines ; of the wings 12 lines.

"*b.* Arctic America. District watered by the Mackenzie and Slave Rivers. Presented by Sir John Richardson."

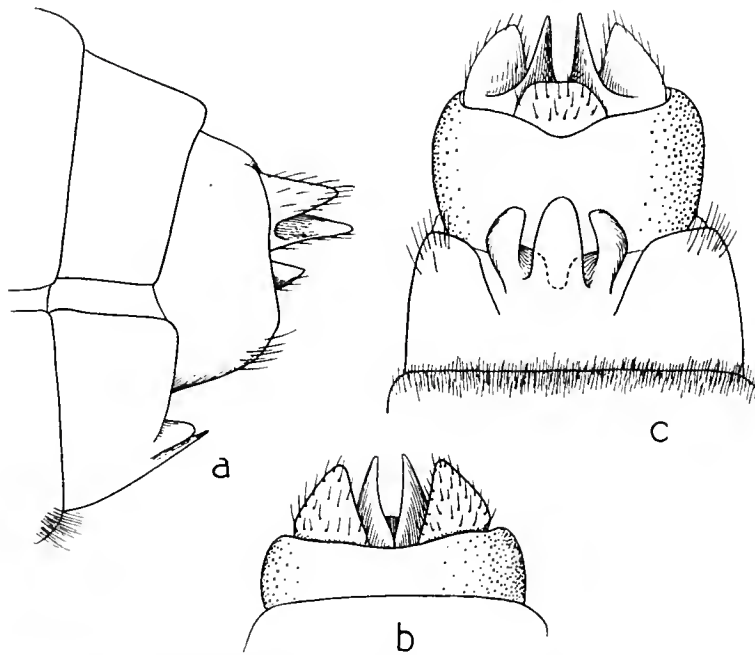


FIG. 61.—*Limnophilus nebulosus* Kirby ♀ (type): *a*, genitalia, lateral, *b*, dorsal, *c*, ventral.

Walker describes the species again under *L. stipatus* as follows :

"*Nigro-cinereus, subtus testaceus ; antennae fulvae ; pedes testacei ; alae anticae fuscae, albido guttatae et maculatae.*

"Allied to *L. variegatus*. Black, tinged with gray, clothed with pale hairs and with longer black hairs, testaceous beneath : antennae tawny ; 1st joint mostly black or brown : legs testaceous : fore-wings brown, with numerous whitish dots and spots, many of these confluent, and especially so on the disk and on the fore border : hind-wings whitish. Length of the body 4 lines ; of the wings 12 lines.

"*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.

"*b.* Arctic America. District watered by the Mackenzie and Slave Rivers. Presented by Sir John Richardson."

To this we add :

What is doubtless Kirby's type of *nebulosus* is now in bad condition, lacking

head, prothorax, and all or the greater part of each of the legs, and the mesothorax being also much damaged. The *fore wings* are dark brown with white spots scattered all over, the largest of these being in the middle of the wing extending from the discal cell to Cu_1 ; there is a conspicuous group of these spots also in cells R , R_2 , R_3 , R_4 , R_5 and M_2 , adjoining the anterior line of the anastomosis; the costal margin including cell C and cell Sc is wholly clear from the base of the wing to the region of the pterostigma.

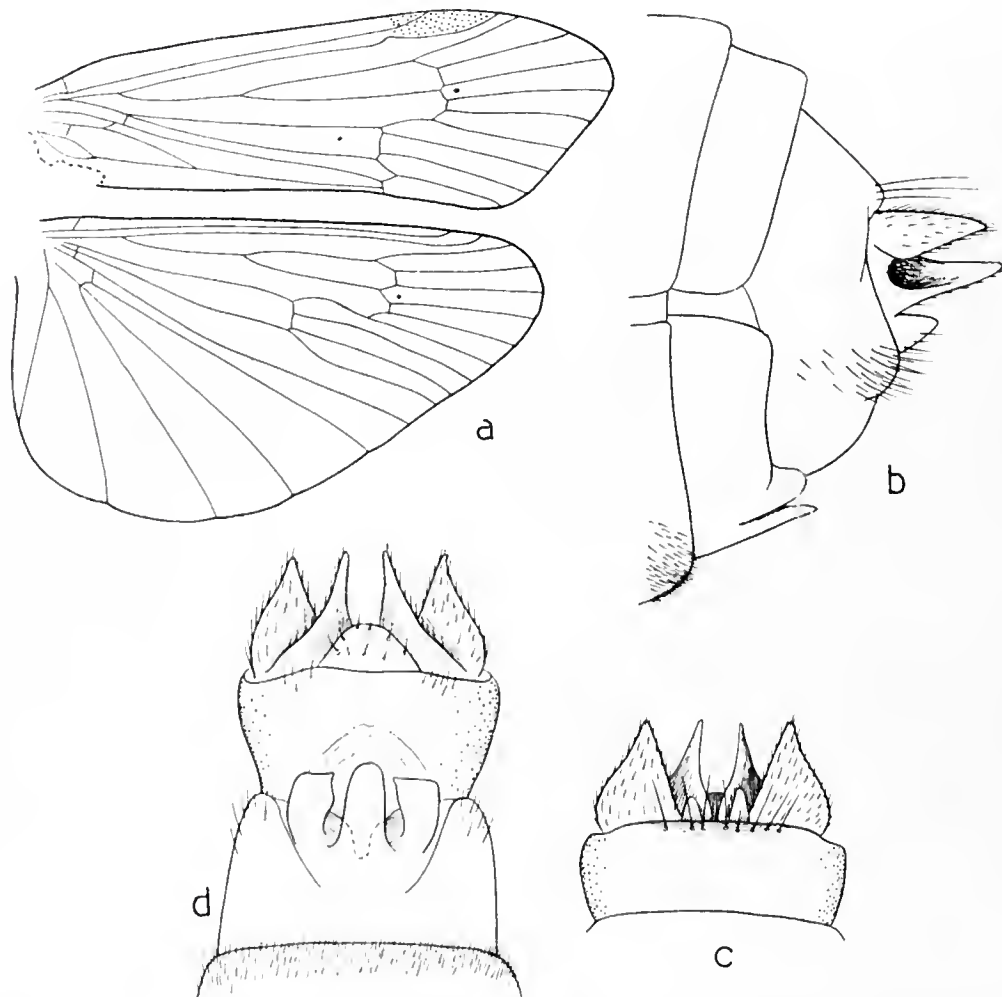


FIG. 62.—*Limnophilus nebulosus* Kirby ♀ (*stipatus* b): a, wings, b, genitalia, lateral, c, dorsal, d, ventral.

Length of the fore wing, 12 mm.

Kirby's type of *femoralis*, which we judge to belong to the same species, may be described as follows:

Head above with a black shield, in the side margins of which the yellow lateral ocelli are placed; along the margins of the shield in front of the ocelli are four yellow spots from which some brown bristles arise; on the posterior part of the shield are a few white hairs; the area from the base of the antenna along the inner margin of the eye and including the posterior warts is brown;

face brown with some yellow areas covered with mostly black and with some yellow hair ; basal joints of the *antennae* dark brown with black and some pale hair, the succeeding joints brownish yellow with short, black hair ; *prothorax* and tegulae yellow, with black bristles ; mesonotum black, with a longitudinal brown stripe each side of the median line in the anterior half, these stripes set with black bristles ; *legs* yellow, with yellow spurs and black spines ; *fore wings* brown, with many white dots and areas, covered with very short black

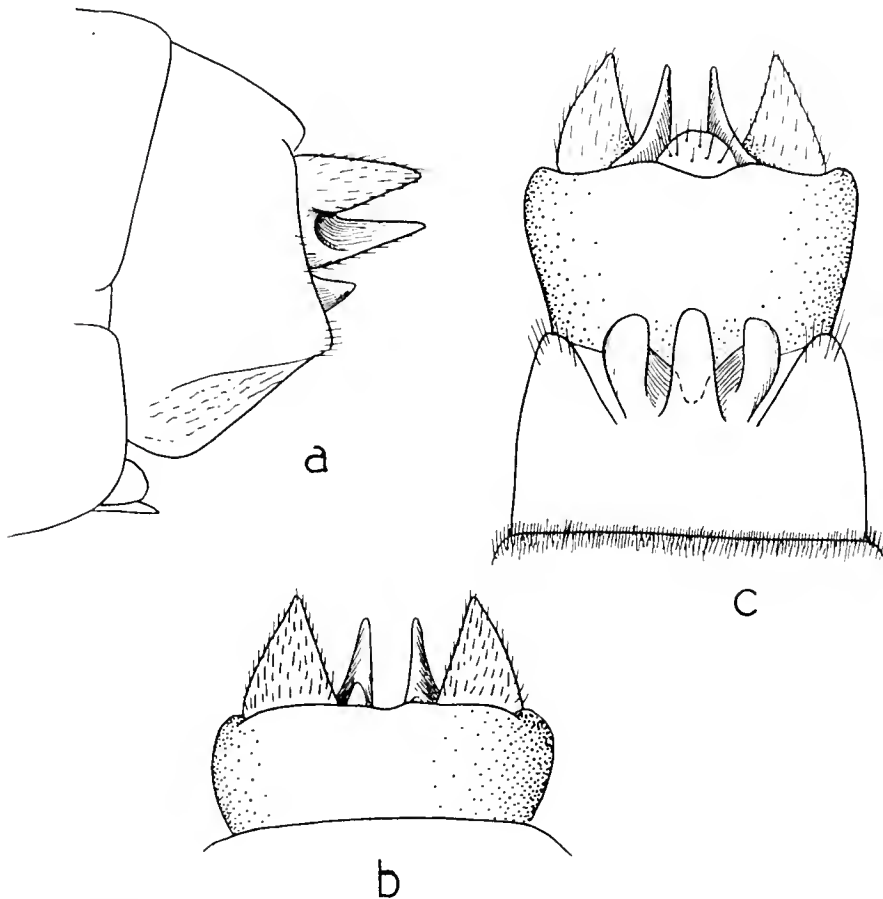


FIG. 63.—*Limnophilus nebulosus* Kirby ♀ (*stipatus* a) : a, genitalia, lateral, b, dorsal, c, ventral.

and white hair located mostly on the dark and light areas respectively ; some black bristles on the veins, particularly on R_1 , Cu_1 , the anal veins, and the base of R_s ; the larger transparent areas include the costal margin back to R_1 ; the parts of the cells adjoining the anterior anastomosis and a somewhat oblique stripe in the middle of the wing from $R_4 + 5$ to Cu_1 ; *abdomen* yellowish brown with dark brown markings.

The example from Hudson's Bay (specimen *a* of Walker's *stipatus*) is intermediate between Kirby's two types in the proportion of brown and white in the fore wing.

Genitalia, female, of Kirby's *nebulosus* (*perforatus* b Walker, Arctic

Amer.).—Apical margin of the terminal dorsal segment shallowly excised; beyond it, from above, are two pairs of triangular processes, the outer and upper with broad, convex outer margins, the inner and lower, narrow with acute apices: from the side, these processes are divided from each other by a deep excision; from beneath, there is a large lobe at the base of the processes with a truncate apex; vulvar scale with the inner lobe thimble-shaped and slightly longer than the outer, whose apices are obliquely rounded; apical margin of the terminal sternite excised at its centre.

Genitalia, female, of Kirby's *femoralis* (*stipatus* b Walker, Arctic Amer.).—In *femoralis* Kirby there is a pair of small membranous finger-like processes arising at the centre of the apical margin of the terminal dorsal segment, one finger slightly longer than the other; the distal abdominal processes are more slender at their apices than in *nebulosus*; the triangular ventral lobe is rounded at its apex; the outer lobes of the vulvar scale are truncate at their apices instead of obliquely rounded, and the apical margin of the terminal sternite is not excised.

Genitalia, female, of Walker's *stipatus* a from Hudson's Bay, considered by us to be also Kirby's *nebulosus*.—The form of the genitalia is intermediate between that of the type of *nebulosus* and that of Kirby's *femoralis*. The two dorsal fingers are present, but one is reduced to minute proportions; in the outer pair of terminal triangular processes, the plates are shaped rather as in *nebulosus* with the apices a little more acute; the ventral lobe is smaller than in either *nebulosus* or *femoralis* with the apex rounded; the apical margin of the terminal sternite is excised, and the apices of the outer lobes of the vulvar scale are rounded.

The genitalia in these three examples of the species show slight differences in various parts, particularly in the presence and absence of the small dorsal finger-like processes.

Having regard to the partial disappearance of one of these fingers in two of the specimens and their total absence in the third, we are of opinion that this character is not of sufficient importance to warrant the separation of the insects in different species.

The facts with regard to the various types of this species appear to be these: Kirby had two specimens collected by Sir John Richardson in Arctic America; the darker one he described as *L. nebulosus* and the lighter one as *L. femoralis*.

Walker, dealing later with the same material, and not recognizing the specimens as Kirby's types, described the dark one as *L. perforatus*, specimen b (the other *L. perforatus* being a *L. despectus*), and the lighter one as *L. stipatus*, specimen b.

Walker had a third example, from Hudson's Bay, collected by Barnston, which is specimen a of *stipatus*, and also the same as *nebulosus*.

McLachlan (1875) surmised that Walker's *stipatus*, specimen b, was Kirby's type of *nebulosus*; had he but recognized that Walker's *perforatus* b was also one of Kirby's types, he would doubtless have regarded this as the type of

nebulosus, since it is darker than *stipatus*, specimen *b*. However, McLachlan regarded all three specimens as of one species and in this conclusion we agree. We have figured the genitalia of all three of the specimens in case the discovery of males should make it desirable to make specific distinctions.

***Limnophilus partitus* Walker.**

(Fig. 64.)

- 1852. *Limnophilus partitus* Walker, Cat. Neur. Brit. Mus. : 32.
- 1861. *Limnophilus trimaculatus* Hagen, nec Zett., Syn. Neur. N. Amer. : 261.
- 1863. *Limnophilus partitus* McLachlan, Ent. Ann. : 157, 161.
- 1864. *Goniotauius partitus* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 816.
- 1875. *Limnophilus partitus* McLachlan, Rev. and Syn. Trich. : 79.
- 1880. *Limnophilus partitus* McLachlan, Rev. and Syn. Trich., Suppl., pt. 2 : xxi.
- 1892. *Goniotauius partitus* Banks, Trans. Amer. Ent. Soc., 19 : 363.
- 1907. *Limnophilus partitus* Ulmer, Genera Insect., fasc. 60a : 44.
- 1907. *Limnophilus partitus* Banks, Cat. Neur. Ins. U.S. : 37.
- 1934. *Limnophilus partitus* Betten, N.Y. State Mus. Bull., 292 : 330.
- 1935. *Limnophilus partitus* Milne, St. N. Amer. Trich., 2 : 47.
- 1936. *Limnophilus partitus* Milne, St. N. Amer. Trich., 3 : 60 (*L. sublunatus* Provancher is listed as a synonym.)

Walker describes the species as follows :

“*Nigro-cinereus* ; *antennis, pedibus, abdominisque apice ferrugineis* ; *alae hyalinae, anticae vitta interrupta maculisque duabus fuscis*.”

“Black, with a gray covering, clothed with pale hairs : antennae ferruginous ; 1st joint black : legs ferruginous : wings colourless ; fore-wings with an irregular brown stripe near the hind border, this stripe is obliquely interrupted before the middle, a little beyond which it contains two colourless dots ; a brown spot on the parastigma, and another on the 2nd, 3rd and 4th apical areolets ; veins brown. Length of the body $3\frac{1}{2}$ lines ; of the wings 11 lines.

“*a*. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.”

To this we add :

Head above black in the centre, the area along the inner margins of the eyes, and the posterior warts, brown ; the dark area includes the lateral ocelli and bears some yellow hairs both anteriorly and posteriorly ; yellow hair also on the posterior warts ; face dark brown to black, with sparse brown and some pale hair ; palpi brown ; 1st and 2nd joints of the *antennae* deep brown to black, the basal joint with mostly pale hair, the next succeeding joints yellow, narrowly ringed with dark brown ; pronotum with yellow dorsal warts set with yellow bristles ; mesonotum black with a few yellow hairs mostly in two longitudinal rows alongside the median line anteriorly ; *thorax* black beneath, with yellow hair ; femora brown, the tibiae and tarsi yellow with yellow spurs and black spines ; the inner margin of the first femora basally with a comb of short, black spines ; *fore wings* mostly pale and transparent, with black bristles on Cu_1 and the anal veins and on R_1 and Rs at the base ; the irregular brown stripe of the original description fills cells $M_3 + 4$,

Cu_{1a} and most of the cells R and M; in the middle of the wing it is interrupted, as Walker indicated, by a very oblique, pale area running from Cu to the discal cell; there is also a broad, brown stripe filling the distal two-thirds of cell R₄ and extending a little into cell R₃ and cell R₅; the posterior margin is brown and the pterostigma also; *abdomen* dark brown to black.

Length of the fore wing, male, 12 mm.

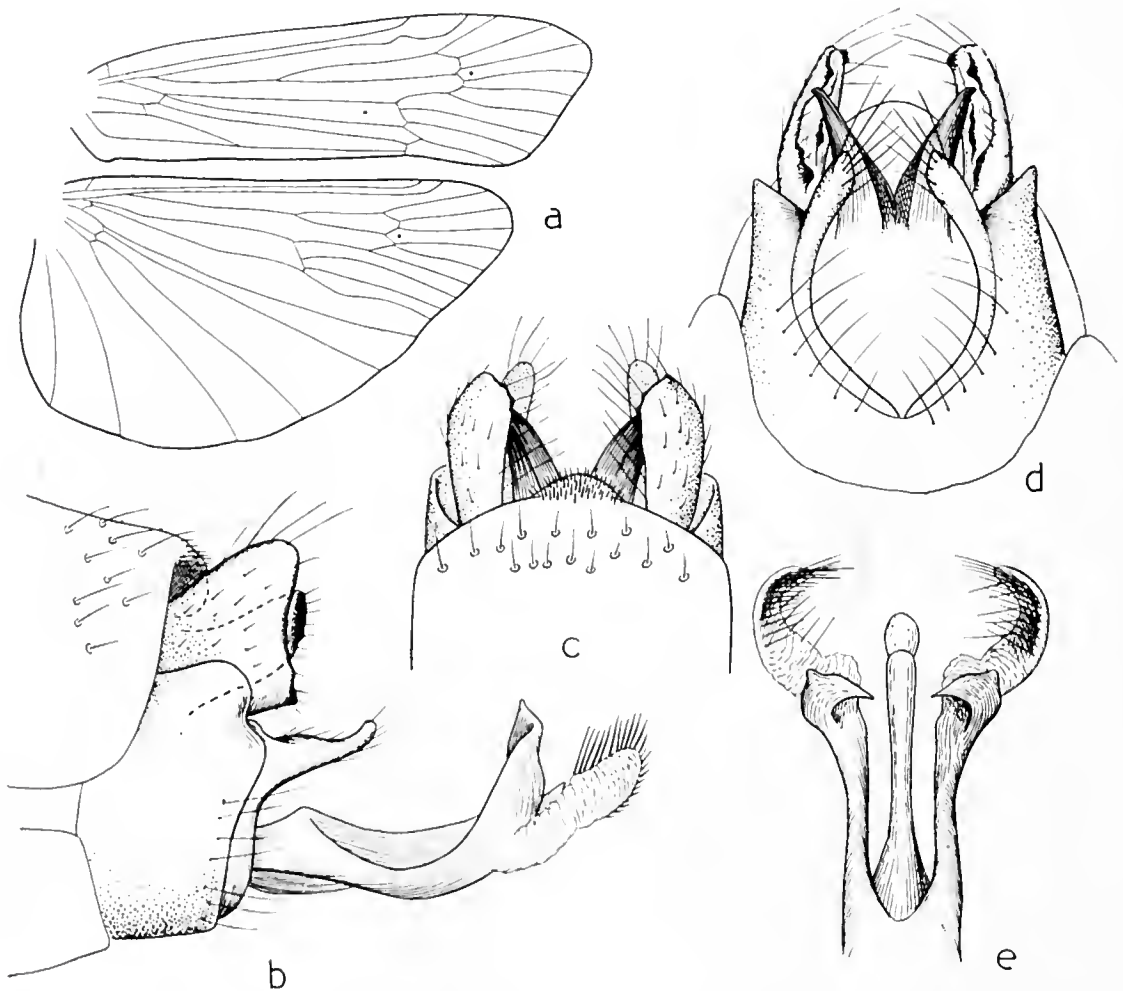


FIG. 64.—*Limnophilus partitus* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral, penis, etc., omitted, *e*, penis and sheaths, dorsal.

Genitalia, male.—The centre of the apical margin of the 8th tergite is produced in a rounded, down-turned lobe, densely covered with black setae; superior appendages, from the side, very large and deep, distal margin straight or slightly concave, both upper and lower angles bearing minute, inturned teeth, a central, longitudinal and coarsely dentate ridge; intermediate appendages from the side, broad and plate-like, divergent from above; penis slender; penis-sheaths with strongly chitinized, acute branches and membranous, heavily fringed apices; inferior appendages with the bases welded to

the ninth segment, apices long and narrow, from the side, upper margin sinuous, caliper-shaped from beneath.

There is a single type-specimen, a male.

Comparisons of the description of *Limnophilus sublunatus* Provancher (1877) and of the figures of *L. macgillivrayi* Banks (1908), which is a synonym of that species, with the type of *partitus*, make us very doubtful whether Milne (1936) is right in reducing *sublunatus* to synonymy. The figure of *L. sansoni* Banks given by Ross (*Psyche*, 45 : pl. 8, fig. 70) suggests that this species is very close to *partitus*.

Limnophilus indivisus Walker.

(Fig. 65.)

Phryganea guttata Barnston MSS.

- 1852. *Limnophilus indivisus* Walker, Cat. Neur. Brit. Mus. : 34.
- 1852. *Limnophilus subguttatus* Walker, Cat. Neur. Brit. Mus. : 34.
- 1861. *Limnophilus indivisus* Hagen, Syn. Neur. N. Amer. : 260.
- 1861. *Limnophilus subguttatus* Hagen, Syn. Neur. N. Amer. : 261.
- 1863. *Limnophilus indivisus* McLachlan, Ent. Ann. : 157, 161 (*subguttatus* reduced to synonymy).
- 1864. *Limnophilus indivisus* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 836.
- 1875. *Limnophilus indivisus* McLachlan, Rev. and Syn. Trich. : 59.
- 1877. *Limnophilus subguttatus* Provancher Le Nat. Can., 9 : 243.
- 1878. *Limnophilus subguttatus* Provancher, Petite Faun. Ent. Can., 2 : 131.
- 1892. *Limnophilus indivisus* Banks, Trans. Amer. Ent. Soc., 19 : 363.
- 1907. *Limnophilus indivisus* Ulmer, Genera Insect., fasc. 60a : 44.
- 1907. *Limnophilus indivisus* Banks, Cat. Neur. Ins. U.S. : 36.
- 1915. *Limnophilus indivisus* Lloyd, Journ. N.Y. Ent. Soc., 23 : 205, fig. 7.
- 1926. *Limnophilus indivisus* Sibley, Bull. Lloyd Libr., no. 27, Ent. Ser., 5 : 107.
- 1934. *Limnophilus indivisus* Betten, N.Y. State Mus. Bull., 292 : 325, text-fig. 8, pl. 46, fig. 1.
- 1935. *Limnophilus indivisus* Milne, St. N. Amer. Trich., 2 : 46, 51.

Walker describes *L. indivisus* as follows :

"*Pallide testaceus ; alae anticae subtestaceae, macula stigmatica subfusca ; alae posticae hyalinae.*

"Pale testaceous : antennae a little darker : fore-wings slightly testaceous, very minutely tuberculate, with a very pale brown stigma ; veins testaceous : hind-wings colourless. Length of the body 4 lines ; of the wings 13 lines.

"*a. Nova Scotia. From Lieut. Redman's collection.*"

And *L. subguttatus* thus :

"*Testaceus ; alae anticae albido subguttatae, apud stigma fuscum albido plagiatæ.*

"Nearly allied to *L. affinis*. Testaceous, clothed with pale hairs : fore-wings with indistinct dots towards the base, along the hind border and about the tips ; a brown spot on the fore border, and about it a large almost colourless space : hind-wings almost colourless. Length of the body 3½ lines ; of the wings 11 lines.

"*a. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.*"

To this we add :

Pale yellow, almost unicolorous throughout : *head* above with a median nude stripe, the area to each side of this slightly darker and bearing yellow bristles at the anterior margin ; these areas and the posterior warts have a few short, whitish hairs ; a row of yellow bristles posterior to each eye ; face with yellow hair ; palpi with very short yellow hair ; *antennae* with basal joint as long as the head, the second shorter than those next succeeding ; a narrow dark ring in the joints and a scant covering of dark hair ; pronotum with yellow bristles and some short, whitish hairs ; mesonotum brown at the sides and in the middle, with a yellow stripe on each side of the median line anteriorly ; *legs* very pale yellow, the fore tibiae and tarsi a little darker ; spurs yellow ; spines of the tibiae and tarsi black ; in the case of the *fore legs* the spines on the tibiae are mostly yellow ; the femora of the *first legs* are margined with short, yellow spines and the first tarsal joint with dark spines along the inner margin ; *fore wings* yellow, the costal margin and the middle of the wing pale and transparent, a large, indistinct fenestrate area extending to the middle of the wing from the costal margin just before the pterostigma, indistinct markings along the apical margin, and the pterostigma, all brown ; the *hind wing*, male, has a conspicuous patch of black hair on R₂, the apex of the wing yellowish.

Length of the fore wing, male, 13 mm.

Genitalia, male.—Apical margin of the 8th tergite strongly produced at its centre, somewhat rolled over, the produced part from above, with a truncate margin, the whole densely covered with black setae ; superior appendages short but very broad, rounded or slightly triangular, affixed to the segment at the apex of the triangle so that the broad base is directed distally ; the lower angle is blackened and dentate on its inner surface, a few black teeth continuing along the outer margin (the base of the triangle) but not so far as the upper angle ; there is a ridge across the centre of the appendage on its inner surface bearing strong, blackened teeth ; intermediate appendages concealed, about as long as the superior appendages, black and divergent ; below the bases of these appendages is a pair of membranous lobes fringed with hairs ; penis with a constriction below the apex ; sheaths membranous, each with a claw-like branch, apices dilated and fringed ; inferior appendages small and narrow, welded to the margin of the 9th sternite.

In a comparison of the genitalia of *indivisus* with those of the European species *stigma*, it will be observed that there is a close resemblance between nearly every part. We have decided, however, to keep the species distinct and to call attention to the points in which they differ :

- (1) The margin of the 8th tergite is wider at its apex in *indivisus* than in *stigma*.
- (2) The intermediate appendages are much longer in *indivisus*.
- (3) In *stigma* the dentate ridge continues completely round the inner surface of the superior appendage, but only partly round in *indivisus*.

(4) The penis-sheaths in *stigma* are furcate, the two branches broad and approximately equal in size. In *indivisus*, the upper branch is claw-shaped, fringed on its upper surface; the distal branch dilated and heavily fringed.

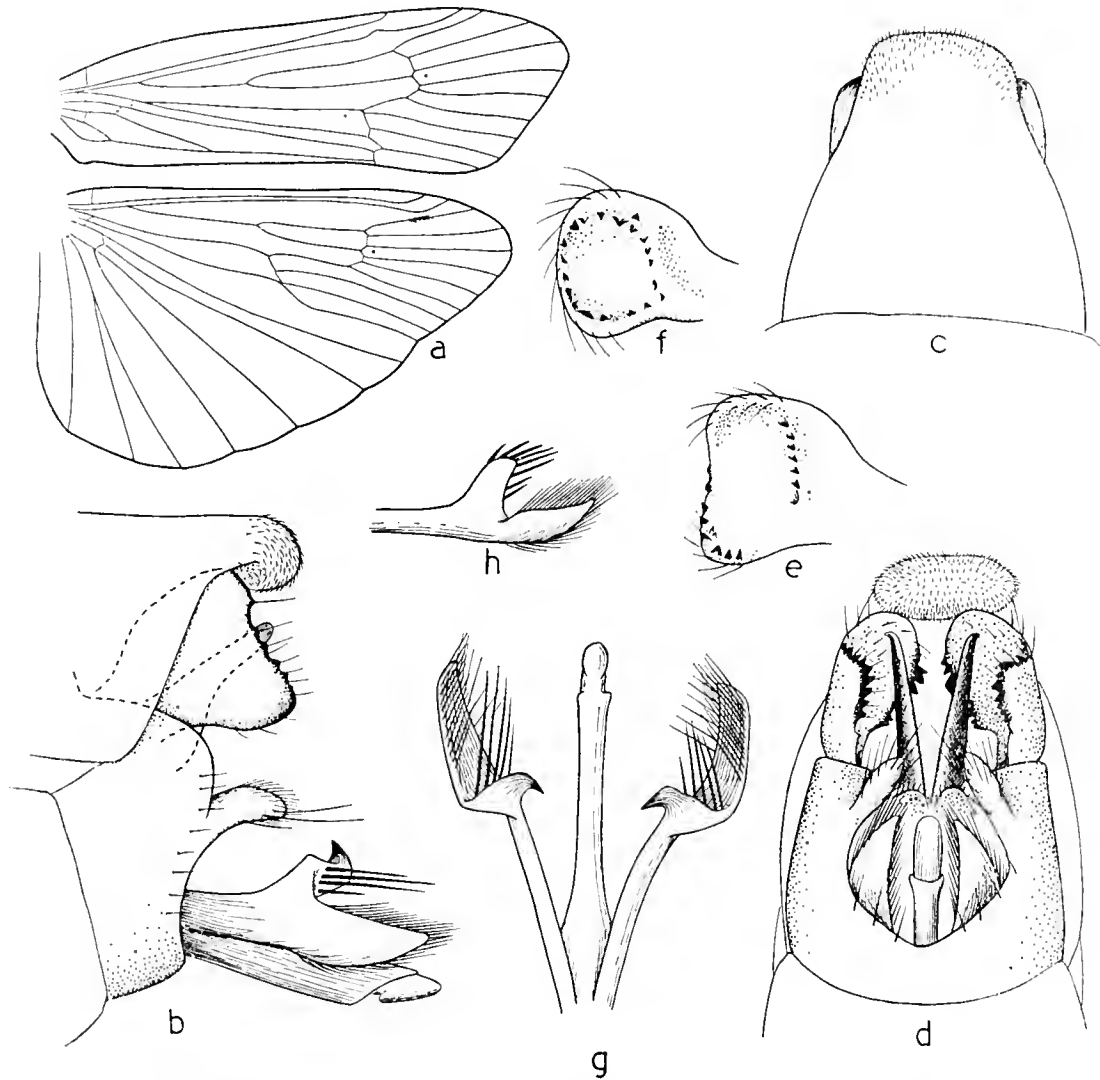


FIG. 65.—*Limnophilus indivisus* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral; *e*, superior appendage of *indivisus*, from within, *f*, the same of *L. stigma* Curtis; *g*, penis and sheaths of *indivisus*, dorsal; *h*, penis-sheath of *L. stigma*, lateral.

We designate as the type the male collected in Nova Scotia by Redman; compared with other examples it is very lightly coloured. A female, probably of this species (Walker mentions but one specimen), also collected in Nova Scotia by Redman, has the apex and the posterior part of the fore wing distinctly brown, with small, white dots and larger light areas, the costal margin clear, an oblique pale spot extending through the middle of cells M and R and into the discal cell; a larger white area posterior to the pterostigma encloses the line of the anastomosis.

The type of *L. subguttatus* Walker, a male, has the fore half of the wing lightly coloured except in the brown pterostigma, which stands out prominently. We judge *L. subguttatus* Walker to have been correctly reduced to synonymy.

***Limnophilus rhombicus* (Linné).**

(Fig. 66.)

- 1758. *Phryganea rhombica* Linné, Syst. Nat. Ed., 10 : 548.
- 1815. *Limnophilus rhombicus* Leach, Edin. Encyc., 9, pt. 1 : 136.
- 1834. *Phryganea rhombica* Pictet, Recherch. Phryg. : 148, pl. 9, fig. 1.
- 1848. *Chaetotaulius rhombicus* Kolenati, Gen. et Spec. Trich., pt. 1 : 45.
- 1852. *Limnophilus rhombicus* Walker, Cat. Neur. Brit. Mus. : 22.
- 1852. *Limnophilus combinatus* Walker, Cat. Neur. Brit. Mus. : 28.
- 1859. *Chaetotaulius rhombicus* Hagen, Verh. Zool. Bot. Ges. Wien, 9 : 76.
- 1861. *Limnophilus rhombicus* Hagen, Syn. Neur. N. Amer. : 254.
- 1861. *Limnophilus combinatus* Hagen, Syn. Neur. N. Amer. : 255.
- 1863. *Limnophilus rhombicus* McLachlan, Ent. Ann. : 156, 161 (*combinatus* reduced to synonymy).
- 1864. *Goniotauius combinatus* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 815.
- 1864. *Limnophilus rhombicus* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 839.
- 1875. *Limnophilus rhombicus* McLachlan, Rev. and Syn. Trich. : 48, pl. 5, figs. 1-8.
- 1875. *Limnophilus combinatus* McLachlan, Rev. and Syn. Trich. : 50.
- 1891. *Limnophilus rhombicus* Wallengren, Skand. Neur., 24, no. 10 : 41.
- 1892. *Limnophilus combinatus* Banks, Trans. Amer. Ent. Soc., 19 : 363.
- 1907. *Limnophilus rhombicus* Ulmer, Genera Insect., fasc. 60a : 44, pl. 32, fig. 4.
- 1907. *Limnophilus combinatus* Banks, Cat. Neur. Ins. U.S. : 36.
- 1909. *Limnophilus rhombicus* Ulmer, (Brauer) Süsswasser Faun. Deutsch., Heft. 5-6 : 122.
- 1909. *Limnophilus rhombicus* Vorhies, Trans. Wisc. Acad. Sci., 16 : 661, pl. 55, figs. 3-6.
- 1914. *Limnophilus rhombicus* Martynov, Ann. Mus. Zool. Ac. Sci., St. Petersb., 19 : 187.
- 1915. *Limnophilus combinatus* Lloyd, Journ. N.Y. Ent. Soc., 23 : 203, pl. 15, figs. 9, 13.
- 1916. *Limnophilus rhombicus* Esben-Petersen, Danmarks Faun., Trich. : 155, fig. 138.
- 1926. *Limnophilus rhombicus* Sibley, Bull. Lloyd Libr., no. 27, Ent. Ser., 5 : 107.
- 1934. *Limnophilus rhombicus* Betten, N.Y. State Mus. Bull., 292 : 331, pl. 46, fig. 4.
- 1935. *Limnophilus combinatus* Milne, St. N. Amer. Trich., 2 : 47.

Walker describes the species as follows :

As *rhombicus* :

"*Ochraceus ; alae anticae cinereo-flavescentes, macula magna rhomboidali pallida utrinque fusco marginata. Long. 6-8 ; alar. 12-16 lin.*

"*g. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.*"

As *combinatus* :

"*Ferrugineus, abdomine pedibusque testaceis ; alae anticae fuscae, costa maculaque magna subrhomboidali discali guttisque subtestaceis, apicem versus subtestaceae fusco conspersae, alae posticae hyalinae.*

"*Ferruginous, clothed with pale hairs : abdomen and legs testaceous : forewings brown, slightly testaceous along the fore border and with a large nearly rhomboidal spot of that colour in the disk ; some pale testaceous dots in the disk and more towards the tips where the brown hue least prevails : hind wings colourless. Length of the body 5 lines ; of the wings 16 lines.*

"*a. Newfoundland. Presented by W. C. St. John, Esq.*"

To this we add :

Head dark reddish brown above, a little lighter along the eyes, the central shield with yellow bristles mostly at its anterior apex; some paler yellow hairs on the posterior warts, face yellowish brown with yellow hair; *antennae* and palpi yellowish brown, the antennae with black hair broadly encircling the joints; pronotum brown, with yellow bristles; mesonotum reddish brown;

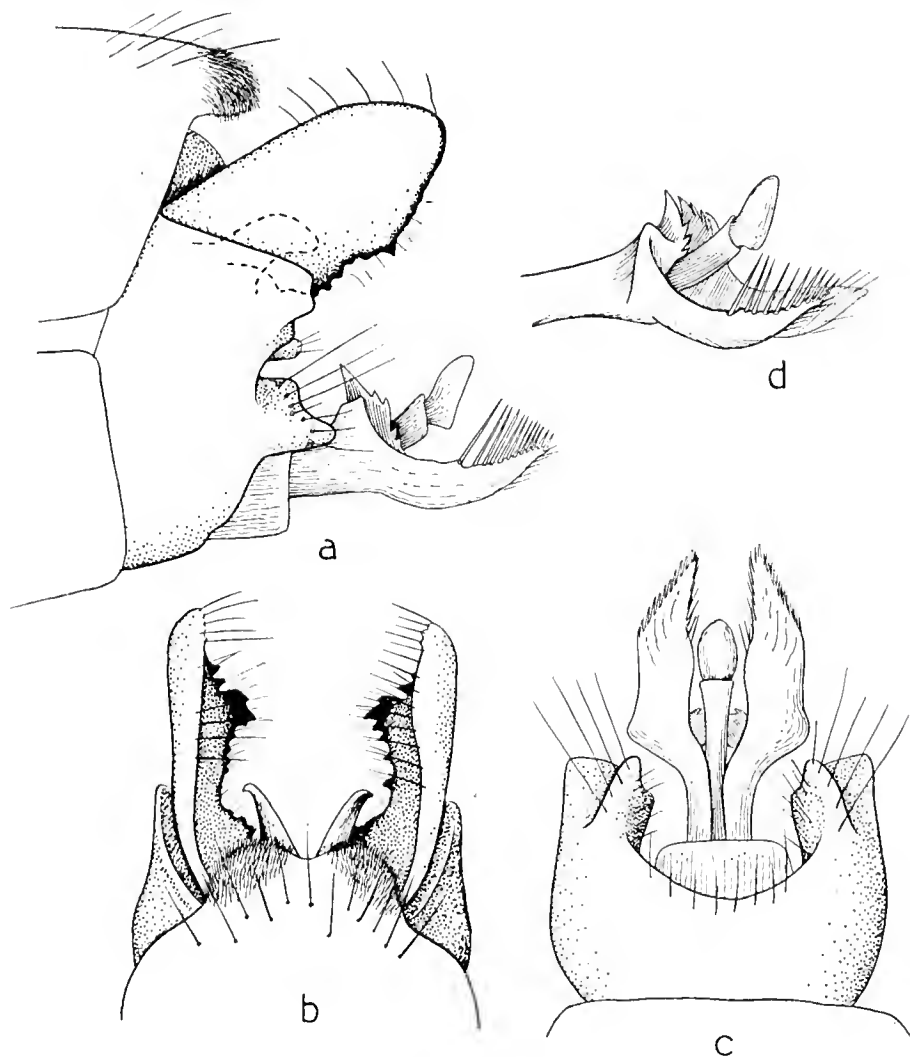


FIG. 66.—*Limnophilus rhombicus* L. ♂ (*combinatus* Walk.): *a*, genitalia, lateral, *b*, dorsal, *c*, ventral; *d*, penis and sheaths, dorso-lateral.

legs and spurs yellow, the tibiae and tarsi with black spines; *fore wings* brown and yellow, the brown deepest at the base of the wings, particularly on the bases of Cu_1 and the anal veins; at the middle of the wings there is a broad, oblique, transparent area reaching from R_1 to the 1st A; on each side of this an irregular brown area enclosing some white dots; another transparent area encircles the anterior line of the anastomosis, enclosing some dark spots at the cross-veins; the anterior margin is clear, the apex brown with white dots, the

post-apical margin mostly clear; R_2 of the *hind wing* has, in the male, a "beard", like that in *L. indivisus*: *abdomen* reddish brown; the *genitalia* yellow.

Length of fore wing, male, 18 mm.

Genitalia, male.—Apical margin of the 8th segment produced in a pair of rounded lobes close together and set with short, black setae, which are so arranged that there is a small triangular excision between them free of setae; superior appendages very large, elongately oval, yellow, very convex externally and with the upper and lower margin considerably rolled inward; the lower margin is black and coarsely but obtusely toothed, and in the middle of the margin (or rather nearer the apex than the middle) is a very large triangular projection turned inwards, and coarsely toothed in a very irregular manner, fringed with long pale hairs (the form of the projection varies in individuals); internally the appendages are deeply concave; intermediate appendages lying deep in the cavity of the end of the abdomen, short, obtuse, straight, laterally broad, the apex obtuse and black; side-pieces of the 9th ventral segment broad, fringed with long pale hairs; inferior appendages short, sub-triangular, with long dark hairs at the apex; penis elongate, reddish; a minute triangular tooth on the middle of the sixth and seventh ventral segments.

This is an almost word-for-word transcription of McLachlan's description of the genitalia of *Limnophilus rhombicus*. We add that the penis-sheaths are branched some distance before the apices, the branch being rather broad and twisted, with the upper margin strongly serrate; there is also a pair of membranous projections at the base of the intermediate appendages, each furnished at its apex with some long hairs.

In a British example of the species the branch of the penis-sheath is less elbowed than is shown in the figure.

The description given above is of Walker's single type of *L. combinatus*, a male, which we consider to be the same as *L. rhombicus*, having compared the cleared genitalia with those of a British and a French example of this species. We have also compared this specimen with the specimen from Hudson's Bay, which Walker determined as *L. rhombicus*, but can find no differences in the cleared genitalia; in the latter the colour is in general lighter than in the type of *combinatus*, and the apex of the wing and the apical margins are uniformly light brown with white dots instead of the apex being distinctly darker than the post-apical region.

In the European specimens in the collection of the British Museum there is a considerable variation in the colour of the wings, the anal angle being often darker than the wing apex.

We do not find structural differences of such a character as to justify separating the European and American forms.

Limnophilus extractus Walker.

(Fig. 67.)

1852. *Limnophilus extractus* Walker, Cat. Neur. Brit. Mus. : 34.
 1861. *Limnophilus hyalinus* Hagen, Syn. Neur. N. Amer. : 258.
 1861. *Limnophilus extractus* Hagen, Syn. Neur. N. Amer. : 260.
 1863. *Limnophilus hyalinus* McLachlan, Ent. Ann. : 157 (quotes Hagen's opinion that *hyalinus* is the same as *extractus*).
 1863. *Limnophilus extractus* McLachlan, Ent. Ann. : 161 (lists *hyalinus* as a synonym).
 1864. *Limnophilus extractus* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 835, 843 (lists *hyalinus* as a synonym).
 1876. *Limnophilus extractus* McLachlan, Rev. and Syn. Trich., Suppl., pt. 1 : vii.
 1892. *Limnophilus extractus* Banks, Trans. Amer. Ent. Soc., **19** : 363.
 1907. *Limnophilus extractus* Ulmer, Genera Insect., fasc. **60a** : 44.
 1907. *Limnophilus extractus* Banks, Cat. Neur. Ins. U.S. : 36.
 1908. *Limnophilus extractus* Banks, Trans. Amer. Ent. Soc., **34** : 267, pl. 18, figs. 6, 7.
 1934. *Limnophilus extractus* Betten, N.Y. State Mus. Bull., **292** : 324.
 1935. *Limnophilus extractus* Milne, St. N. Amer. Trich., **2** : 44, 51.

Walker describes the species as follows :

"*Obscure testaceus ; palpis pedibusque pallidioribus ; thorax fusco bivittatus ; abdomen supra fuscum ; alae sordide albidæ.*

"Dark testaceous, clothed with pale hairs : antennae brown towards the tips : palpi and legs pale testaceous : thorax with a short broad brown stripe on each side : abdomen brown above : wings whitish ; fore-wings with a slight testaceous tinge along the hind border ; veins pale testaceous. Length of the body $3\frac{1}{4}$ lines ; of the wings 11 lines.

"*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

To this we add :

Head above brown, lighter at the posterior margin, covered with a few yellow hairs ; face brownish yellow, with scattered black hairs ; *antennae* yellow, darker toward the tip, the basal joint with black hair ; palpi yellow ; pronotum yellow with yellow hair ; mesonotum brown, with a dark brown area on either side of the anterior half ; *legs* yellow, with yellow spurs and black spines, the femora of the fore legs with a row of very short black spines along the inner margins ; *wings* pale and transparent, with a yellow tinge, but slightly deeper in the fore than in the hind wings.

Length of the fore wing, male, 11 mm.

Genitalia, male.—Apical margin of the 8th tergite produced in a rectangular lobe densely covered with short, black setae ; beneath it is a very small projection of the apical margin of the 9th tergite, bearing two or three long hairs ; superior appendages very large, triangular from the side, attached to the segment at one corner, distal basal angle with an inturned, blackened and coarsely serrate margin ; on the inner surface, just within this angle, is a cluster of two or three blackened teeth ; intermediate appendages very long, blackened, divergent from above, apices slightly hooked outward ; from the

side, narrow towards the apices, broadened at the base by a dilatation of the lower margin terminating at about halfway in an abrupt angle: side-pieces of the 9th segment triangular and rather long, apices inturned; penis with a collar before the apex and a membranous sleeve, perhaps a lower penis-cover at its base; sheaths membranous, terminating in dilated apices heavily fringed on their upper margins, the fringe extending slightly round the apex;

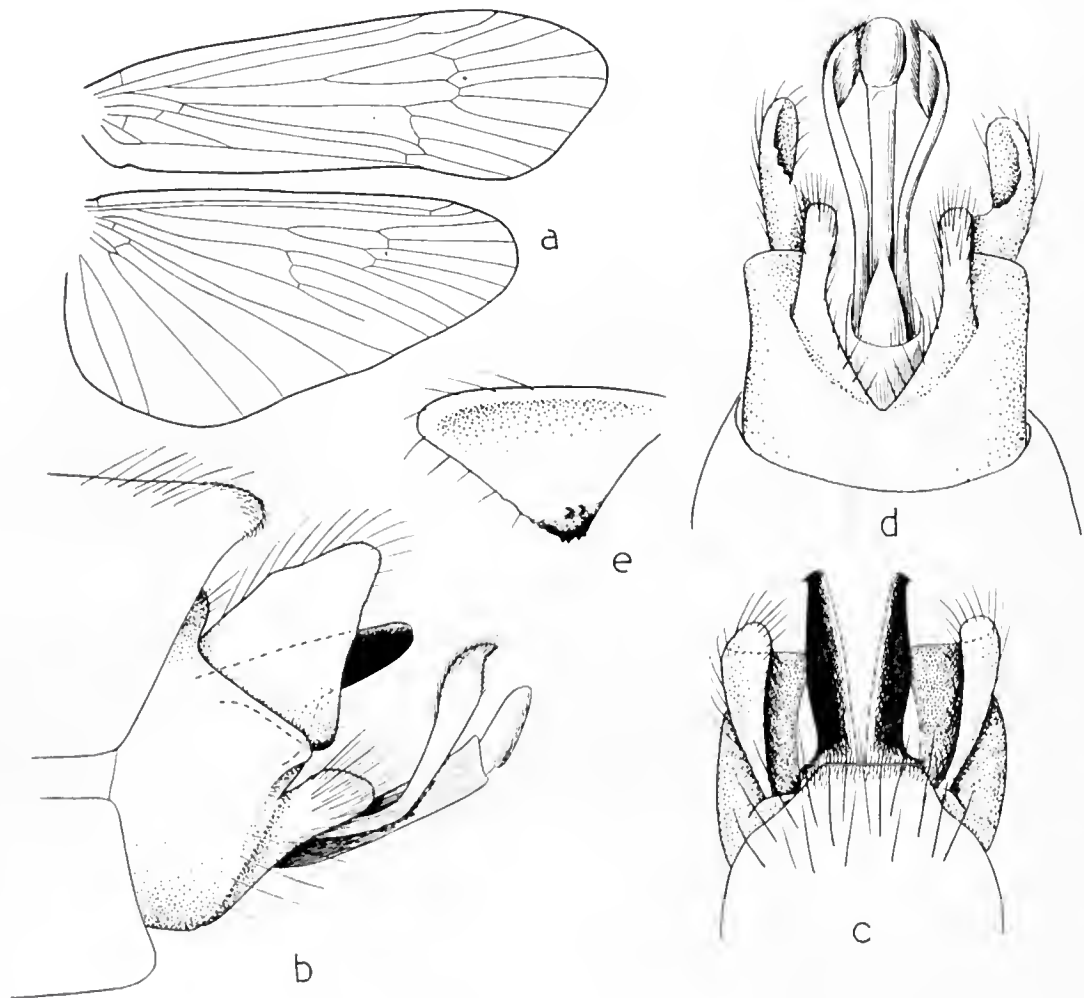


FIG. 67.—*Limnophilus extractus* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral, margin of 8th tergite omitted; *e*, superior appendage, from within.

inferior appendages short, nearly rectangular from the side and welded at their bases to the 9th segment; margin of the 9th sternite deeply and widely excised; no ventral processes.

Hagen regarded his *L. hyalinus* as a synonym and it has generally been so listed.

The type material consists of a single male specimen.

Colpotaulus submonilifer (Walker).

(Figs. 68, 69.)

1852. *Limnophilus submonilifer* Walker, Cat. Neur. Brit. Mus. : 33.
 1861. *Limnophilus submonilifer* Hagen, Syn. Neur. N. Amer. : 260.
 1861. *Limnophilus pudicus* Hagen, Syn. Neur. N. Amer. : 262.
 1863. *Limnophilus submonilifer* McLachlan, Ent. Ann. : 157.
 1864. *Goniotauius pudicus* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 816.
 1864. *Goniotauius submonilifer* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 816.
 1873. *Limnophilus pudicus* Hagen, Proc. Boston Soc. Nat. Hist., **15** : 295.
 1877. *Limnophilus pudicus* Provaneher, Le Nat. Can., **9** : 243.
 1878. *Limnophilus pudicus* Provaneher, Petite Faun. Ent. Can., **2** : 132.
 1892. *Goniotauius pudicus* Banks, Trans. Amer. Ent. Soc., **19** : 363, 373.
 1907. *Limnophilus pudicus* Ulmer, Genera Insect., fase. **60a** : 44.
 1907. *Limnophilus submonilifer* Ulmer, Genera Insect., fase. **60a** : 44.
 1907. *Limnephilus submonilifer* Banks, Cat. Neur. Ins. U.S. : **37** (*pudicus* reduced to synonymy).
 1908. *Limnephilus submonilifer* Banks, Trans. Amer. Ent. Soc., **34** : 267, pl. 18, figs. 12, 16.
 1908. *Limnephilus submonilifer* Banks, Psyche, **15** : 63.
 1909. *Limnephilus submonilifer* Vorhies, Trans. Wise. Acad. Sci., **15** : 666, pl. 54, fig. 18 ; pl. 55, figs. 1, 2.
 1915. *Anabolina submonilifer* Döhler, Deutsch. Ent. Zeitschr., **1915** : 407, figs. 15, 16.
 1926. *Rheophylax submonilifer* Sibley, Bull. Lloyd Libr., no. 27, Ent. Ser., **5** : 107.
 1934. *Rheophylax submonilifer* Betten, N.Y. State Mus. Bull., **292** : 340, text-fig. 6b, pl. 48, figs. 1, 2.
 1935. *Anabolina submonilifer* Milne, St. N. Amer. Trich., **2** : 41, 48-49.
 1938. *Limnephilus submonilifer* Ross, Psyche, **45** : 39 (type of *pudicus* Hagen designated).

Walker describes the species as follows :

" *Niger* ; *antennae articulis basi testaceis* ; *abdomen subtus ferrugineum* ; *pedes testacei* ; *alae anticae fuscae, macula discali albida guttisque fere obsoletis hyalinis, lineisque tribus nigris albidoguttatis* ; *alae posticae subcinereae*.

" Black, clothed with pale hairs, beset with black bristles : joints of the antennae testaceous at the base : abdomen ferruginous beneath : legs testaceous : fore-wings brown, with a whitish spot on the disk, and with almost obsolete colourless dots towards the tips ; three pitchy stripes on each wing, one near the fore border, the other two near the hind border ; veins piceous : hind-wings very slightly gray. Length of the body 5 lines ; of the wings 12 lines.

" *a. North America. Presented by the Entomological Club.*"

To this we add :

Head very dark brown above, the posterior warts and margins of the eyes paler, the disk covered with a few short, white hairs and with many black bristles ; ocelli whitish ; face brown, with mostly yellow hair ; *antennae* very dark brown to black, the joints narrowly ringed with yellow ; palpi brown ; pronotum brown, with black bristles ; mesonotum with a median broad, black band, the sides reddish brown, the median band with black bristles on either side of the median line ; tegulae brown, with black bristles ; *thorax* dark brown below ; *legs* yellow, except the coxae of the middle and hind legs, which are brown ; all the coxae with stout yellow hairs ; tibiae and tarsi with black spines ; the spurs, female, yellow ; *fore wings* in general brown, darkest posteriorly towards the base ; the apex shows a large number

of faint, pale dots ; the pterostigma is dark ; a white spot extends obliquely across cells R and M in the middle of the wing ; the three pitchy stripes of the original description are along R_1 , Cu_1 and the conjoint anal vein, on each of which is a succession of light and dark spots.

Length of fore wing, female, 14 mm.

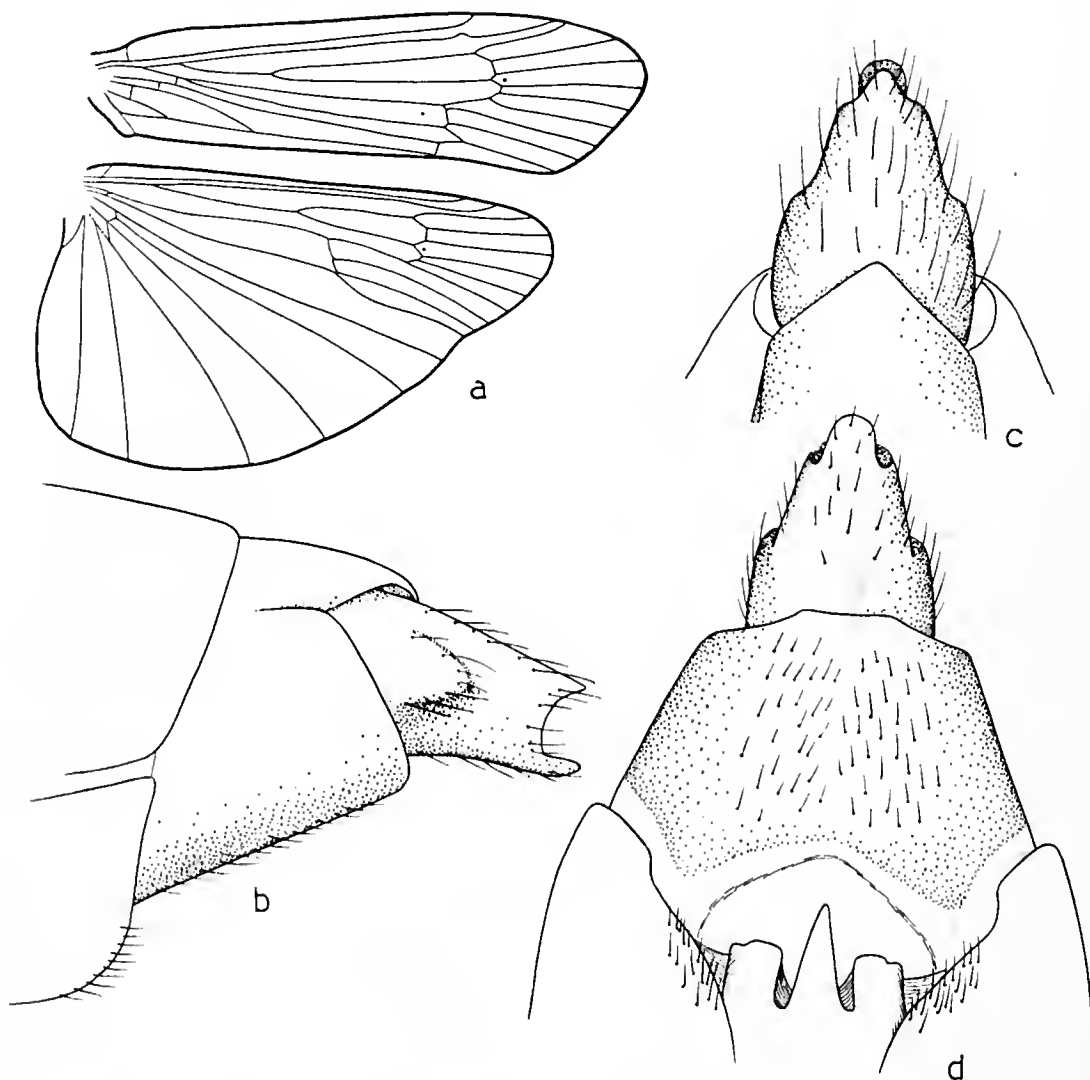


FIG. 68.—*Colpotaulius submonilifer* Walk. ♀: a, wings; b, genitalia, lateral, c, dorsal, d, ventral.

Genitalia, female.—Abdomen considerably tapered towards its apex, which terminates dorsally in a somewhat conical tubular piece ; the margin of the preceding segment is produced in a somewhat triangular fashion ; the tubular piece is deeply excised from the side, with the lower rim projecting slightly beyond the upper ; from above, the upper apical margin is triangular and produced, the lower rounded ; vulvar scale with the median lobe slender and acute at the apex, longer than the side-lobes, whose apices are truncate with a notch towards the lateral margins.

Genitalia, male.—From an example in the Betten collection.

Apical margin of the 8th tergite evenly rounded; superior appendages rather large; from above, rounded or slightly triangular; from the side, triangular with the distal margin slightly excised so as to leave a small, projecting lower angle, which is blackened and forms one end of a short, black

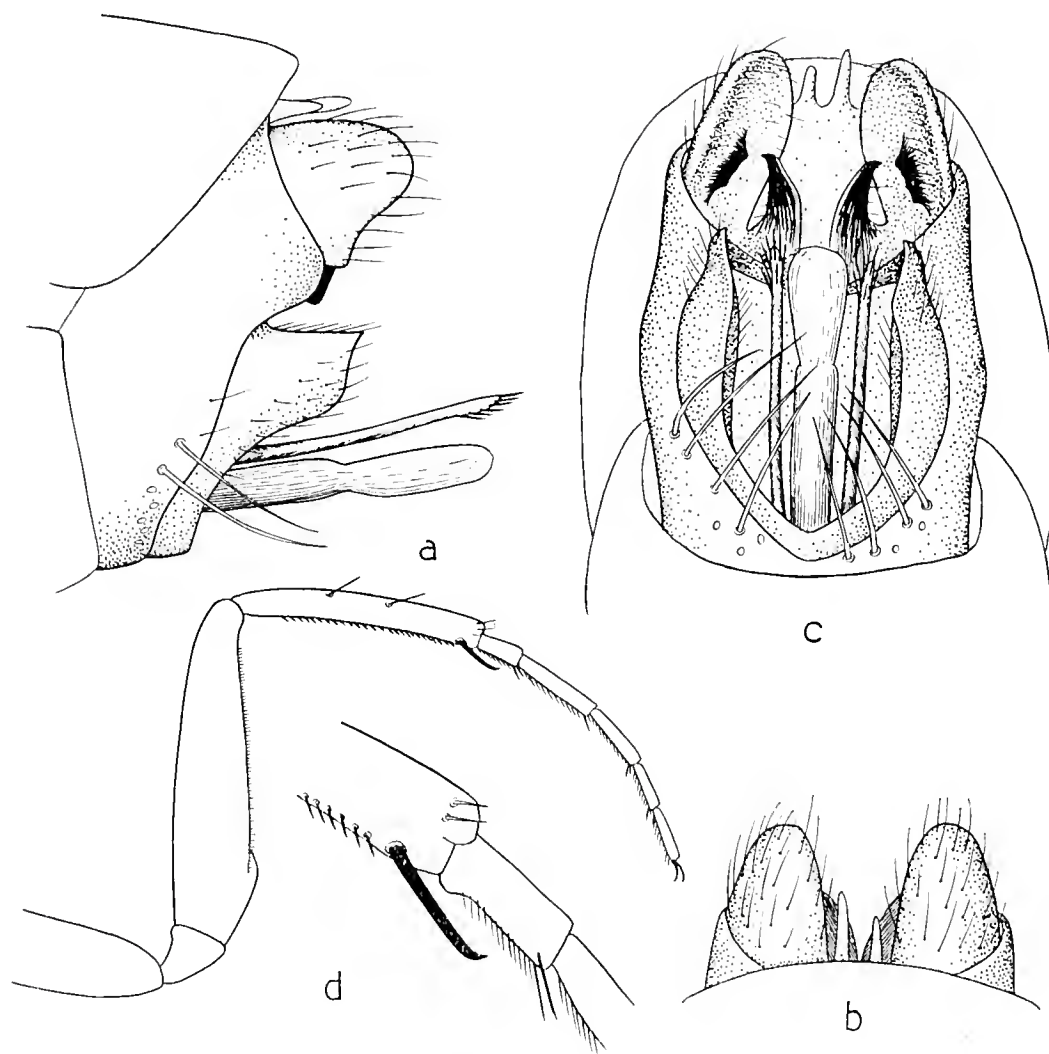


FIG. 69.—*Colpotauius submonilifer* Walk. ♂ (from the Betten collection), *a*, genitalia, lateral, *b*, dorsal, *c*, ventral; *d*, anterior leg showing the abnormal spur more enlarged.

ridge on the under-surface of the appendage; intermediate appendages short, blackened, apices hooked slightly basalwards; inferior appendages short, directed distally, very broad from the side, apices obliquely truncate; penis with a small constriction before the apex; sheaths long, slender and straight, apices fringed with yellow bristles, but not dilated; a few exceptionally long and stout bristles arising from the surface of the 9th sternite.

In the male example under description there is a pair of membranous

finger-like processes arising at the centre of the 9th tergite, the one longer than the other. In other examples the processes are wanting. No importance, therefore, should be attributed to their absence or presence.

The single example of this very common species in the Walker material is a female. The male insect has the fore leg as described by Betten (1934 : 27) as occurring in *Anabolina*, *Colpotaulius*, and perhaps in some other related genera, and in the genus erected in this paper under the name *Frenesia*. The abnormal spur of the male fore leg in *submonilifer* varies somewhat in its shape from that in any of these genera.

Since the first joint of the male tarsus is very short in comparison with the second, we place *submonilifer* in *Colpotaulius*, though in general appearance it may resemble species of *Anabolina*.

Anabolina perpusilla (Walker).

(Fig. 70.)

- 1852. *Limnephilus perpusillus* Walker, Cat. Neur. Brit. Mus. : 35.
- 1861. *Colpotaulius perpusillus* Hagen, Syn. Neur. N. Amer. : 254.
- 1863. *Colpotaulius perpusillus* McLachlan, Ent. Ann. : 161.
- 1864. *Colpotaulius perpusillus* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 809.
- 1874. *Colpotaulius perpusillus* McLachlan, Rev. and Syn. Trich. : 36.
- 1892. *Colpotaulius perpusillus* Banks, Trans. Amer. Ent. Soc., 19 : 363.
- 1907. *Colpotaulius perpusillus* Ulmer, Genera Insect., fasc. 60a : 37.
- 1907. *Colpotaulius perpusillus* Banks, Cat. Neur. Ins. U.S. : 37.
- 1908. *Colpotaulius perpusillus* Banks, Psyche, 15 : 61.
- 1934. *Anabolina perpusillus* Betten, N.Y. State Mus. Bull., 292 : 338.
- 1935. *Colpotaulius perpusillus* Milne, St. N. Amer. Trich., 2 : 42, 50.
- 1936. *Colpotaulius perpusillus* Milne, St. N. Amer. Trich., 3 : 60 (lists *Limnephilus secludens* Bks. and *C. tarsalis* Bks. as synonyms).

Walker describes the species as follows :

“*Testaceus ; antennae fulvae ; alae anticae subtestaceae, posticae albidae.*

“Testaceous, clothed with testaceous hairs : antennae tawny : fore-wings slightly testaceous, very indistinctly mottled with darker colour from the disk to the hind border and about the tips ; veins tawny : hind-wings whitish. Length of the body $2\frac{1}{2}$ lines ; of the wings 6 lines.

“*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.”

To this we add :

Head dark brown above, paler along the margins of the eyes, the brown area with yellow bristles ; *ocelli* yellow, not conspicuous ; *face* brown with yellow bristles along the eyes ; *palpi* brownish yellow ; *antennae* with broad black and narrow yellow annulations, the basal joint with yellow hairs ; *pronotum* and *mesonotum* brown ; the *prothorax* with long, yellow bristles ; *thorax* brown beneath, bearing yellow bristles ; *legs* yellow, femora and tibiae of the fore legs margined with combs of very short, black spines, one black spine on the side of the front tibia, the first tarsal joint, male, very little, if any, shorter than the second ; the spur of the first leg long, black, curved ;

beside it is a black spine of about half its length ; spurs of the other legs normal, yellow, the spines black ; *fore wings* pale yellowish, the veins brown ; there are black bristles on the veins and a scant covering of short, pale hair on

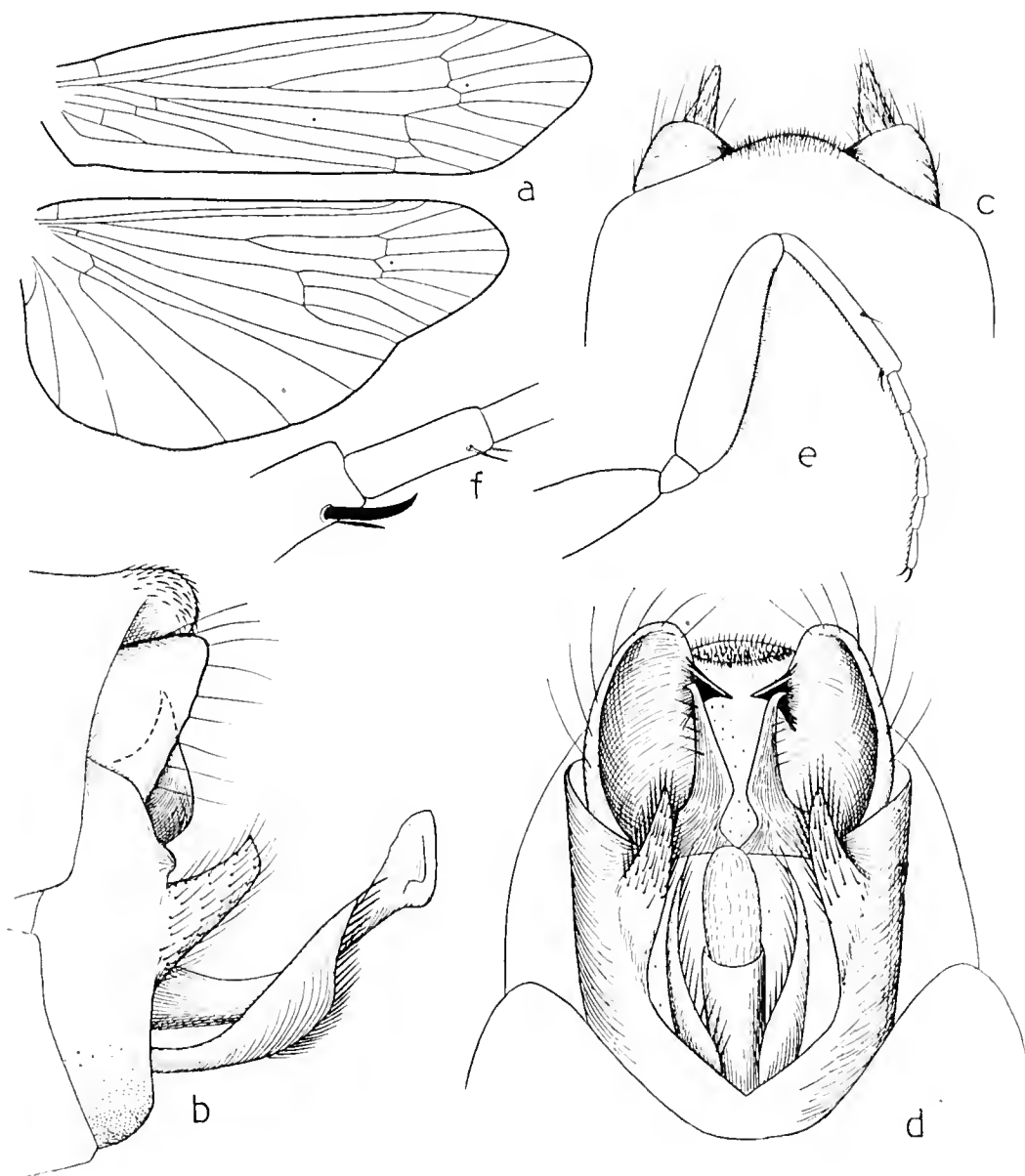


FIG. 70.—*Anabolina perpusilla* Walk. ♂: *a*, wings; *b*, genitalia lateral, *c*, dorsal, *d*, ventral; *e*, anterior leg, *f*, portion of the same, showing the abnormal spur more enlarged.

the membrane ; the indistinct dark mottling referred to by Walker is not now discernible in the type.

Length of the fore wing, male, 7 mm.

Genitalia, male.—Apical margin of the 8th tergite produced at its centre in a rounded lobe densely covered with short, black setae ; superior appendages

short and broad, somewhat rounded from above, triangular from the side, the inner apical margin bearing a single, stout, blackened tooth; intermediate appendages yellow, blade-like, apices out-turned, just reaching the teeth of the superior appendages; lateral margin of the 9th segment produced in a small, acute, inturned side-piece; penis accompanied by a pair of sheaths, broadening and fringed before their apices, which are much produced and pointed; inferior appendages short and straight, directed nearly distally and from the side, with the apex obliquely truncate; apical margin of the 9th sternite widely excised.

The species is represented in the collection by the single male type-specimen here described. We list it in the genus *Anabolia* for the reason that the 1st joint of the male tarsus is of about the same length as the 2nd, thus not conforming to the characters of the genus *Colpotaulius*, in which it has ordinarily been placed.

***Anabolia bimaculata* (Walker).**

(Fig. 71.)

Limnephilus bimaculatus Barnston MSS.

1852. *Limnephilus bimaculatus* Walker, Cat. Neur. Brit. Mus. : 30.

1861. *Limnephilus bimaculatus* Hagen, Syn. Neur. N. Amer. : 263.

1861. *Anabolia sordida* Hagen, Syn. Neur. N. Amer. : 264.

1863. *Anabolia bimaculata* McLachlan, Ent. Ann. : 157, 161.

1864. *Anabolia bimaculata* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 803, 804 (*sordida* reduced to synonymy).

1877. *Anabolia sordida* Provancher, Le Nat. Can., 9 : 258.

1878. *Anabolia sordida* Provancher, Petite Faun. Ent. Can., 2 : 134.

1892. *Anabolia bimaculata* Banks, Trans. Amer. Ent. Soc., 19 : 363.

1905. *Anabolia bimaculata* Ulmer, Ann. k. k. Naturh. Hofmus. Wien, 20 : 61, figs. 6-8.

1907. *Anabolia bimaculata* Ulmer, Genera Insect., fasc. 60a : 46.

1907. *Anabolia bimaculata* Banks, Cat. Neur. Ins. U.S. : 37.

1934. *Anabolia bimaculata* Betten, N.Y. State Mus. Bull., 292 : 353, pl. 50, figs. 7, 8, 10.

1935. *Anabolia bimaculata* Milne, St. N. Amer. Trich., 2 : 43, 49.

1938. *Limnephilus sordidus* Ross, Psyche, 45 : 40 (type of *sordida* Hagen designated).

Walker described the species as follows :

“*Testaceus; antennae ferrugineae; thorax picco bivittatus; alae anticae obsolete irroratae; alae postice albidae.*”

“Testaceous, clothed with pale hairs and black bristles: antennae ferruginous: thorax with a broad pitchy stripe on each side: fore-wings with very indistinct pale dots, which are most prevalent towards the base: hind-wings whitish. Length of the body 5 lines; of the wings 16 lines.

“*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.”

To this we add :

Head brown above, the posterior warts and the tubercle between the antennae much darker, covered with brown and blackish bristles; ocelli

yellow ; face yellowish with black hairs along the eyes ; palpi brown, covered with hair a little paler ; *antennae* brown, ringed with black hair ; pronotum yellowish brown, the warts and their bristles very dark brown ; mesonotum yellowish brown in the centre, dark brown at the sides ; the tegulae dark

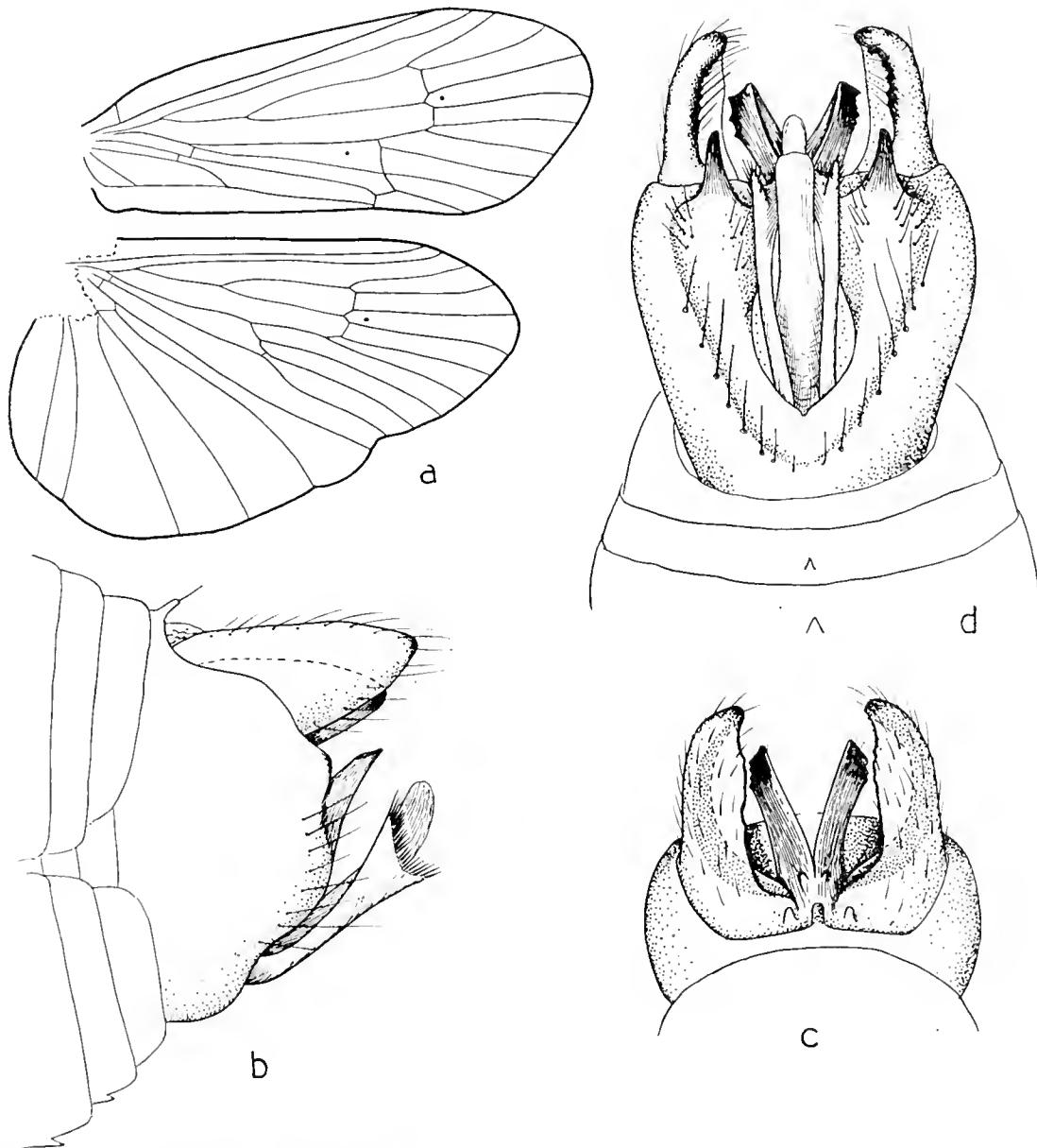


FIG. 71.—*Anabolia bimaculata* Walk. ♂: a, wings; b, genitalia, lateral, c, dorsal, d ventral.

brown, with stout bristles of the same colour ; *thorax* below and the *legs* yellow, the spurs orange, the tibiae and tarsi with black spines ; *fore wings* brown, covered with very short, black hair ; longer black hairs on the anal veins ; pale dots are scattered over the wing, indistinct for the most part except where they interrupt the colour of the veins, and showing most plainly

in the somewhat darker basal parts of the wing, particularly on the conjoined anal vein.

Length of the fore wing, male, 15 mm.

Genitalia, male.—There is a small finger-like process arising at the centre of the apical margin of the 9th tergite and a pair of minute, membranous fingers below and on each side of it; superior appendages very large, concave; from the side, broad at the base, narrowing to a subacute apex, the upper margin rather longer than the lower and fringed sparsely with fine hairs; the apex of the appendage is blackened, the lower margin slightly inturned to make a coarsely crenulate, black rim; intermediate appendages not plate-like but very thick, divergent from beneath, apparently flat-sided, with a pair of very small processes on the upper surface at the base and towards the inner margins; apices blackened and obliquely truncate; outer apical margins coarsely and strongly dentate, margins fringed with strong hairs; inferior appendages welded to the 9th segment, with only the apices, which are pointed and blackened, free; penis slender, sheaths from the side, with the apical margin broadly and widely excised; small ventral processes arising from the middle of the 6th and 7th sternites, that of the 6th the longer.

There is a single type-specimen, a male.

PYCNOPSYCHE Banks.

It is apparent that at least some of the North American species assigned to the genera *Stenophylax* and *Halesus* do not fit into the conception of those genera as previously defined in Europe. We have decided to associate these species with each other irrespective of their spur formulae, and to place them in the genus *Pycnopsyche* set up by Banks with *Limnephila scabripennis* Rambur as the genotype.

It is beyond the scope of the present paper to inquire what species besides the four here described should be included, nor have we in hand the materials needed for a determination of this question. It is possible that the American forms described in *Platyphylax* might also be included in *Pycnopsyche*; we are deterred from including them at this time because of the fairly distinct structure of the genitalia in these forms.

It seems probable that more than one species is included in the North American forms described or listed as *Pycnopsyche* (or *Stenophylax*) *scabripennis*, and it is not now possible to decide which of these corresponds with Rambur's type. The specimens in the Walker series that might be considered in this connection are of two species and are mostly females. One of these species, Walker's *P. antica*, which has long been regarded as being the same as *scabripennis*, we reinstate, and the other (represented by one of the two specimens described by Walker as *Limnephilus divergens*) we describe as new under the name *Pycnopsyche perplexa* (p. 149). Later studies may show which, if either, of these is equivalent to Rambur's *scabripennis*.

Pycnopsyche antica (Walker).

(Fig. 72.)

1852. *Neuronina antica* Walker, Cat. Neur. Brit. Mus. : 9.1861. *Neuronina antica* Hagen, Syn. Neur. N. Amer. : 265 (placed as a synonym of *Limnephila scabripennis* Ramb.).

Walker describes the species as follows :

“*Ferruginea* ; *palpi pedesque testacei* ; *alae anticae subluridae, confertim tuberculatae, fascia brevi gracili discali* ; *alae posticae subhyalinae*.

“Ferruginous : palpi and legs testaceous : fore-wings slightly lurid, with numerous little brown pimples of various size in the areolets, and with a short slender band in the disk : hind-wings subhyaline. Length of the body 5-6 lines ; of the wings 18-20 lines.

“*a, b. Georgia. From Mr. Abbot's collection.*”

To this we add :

Head brownish yellow above, with yellow bristles in front near the antennae and posteriorly on the warts ; face brownish yellow covered with slightly darker hair ; basal joint of the *antennae* brown, covered with black hair, the succeeding joints with broad brown and narrower yellow annulations, covered with black hair ; palpi brownish yellow ; pronotum and mesonotum very dark brown, the tegulae somewhat lighter in colour ; the pronotum and tegulae with yellowish-brown bristles ; the mesonotum anteriorly with an oval patch of brownish bristles ; the metanotum yellow, darker toward its anterior margin ; *legs* yellow, with brown spurs and black spines, spurs 1, 3, 4 ; *fore wings* brownish yellow, the margin somewhat indented at the veins, the membrane coarsely granulated at the base, much more finely at the apex ; scattered over the wing are brown spots of various size ; the apex is margined with brown ; a streak of brown also runs transversely from the posterior margin at the tip of the anal veins to the anterior margin of the discal cell ; the cross-vein of the sector and cross-vein r-m are margined with brown on the distal side, and there is a brown spot also where the 1st A joins the 2nd and 3rd A.

Length of the fore wing, female, 20 mm.

Genitalia, female.—Dorsal surface of the 8th segment set with short, widely-spaced hairs, rather more densely than on the preceding segments ; the 9th segment from above is triangular at its apex, with an excision at the centre of its apical margin, the margin being somewhat sinuous on each side of the excision ; the upper margins of a pair of triangular side-pieces are seen on each side of the central apical part ; these side-pieces form the lateral margins of the 8th ventral segment, which is widely excised ; vulvar scale (?) with the central lobe broadly triangular and shorter than the very wide side-lobes (?) ; no ventral teeth.

Of Walker's two specimens, females, we select as type the one in which

the wings of the right side are complete. The second specimen is not in good condition and none of the wings is complete.

Walker's *Neuronia antica* was reduced to synonymy under *Stenophylax scabripennis* by Hagen (1861), and since that time has not been listed separately. As noted above, there are probably at least two and very likely three species, including *antica*, that have been identified as *scabripennis*.

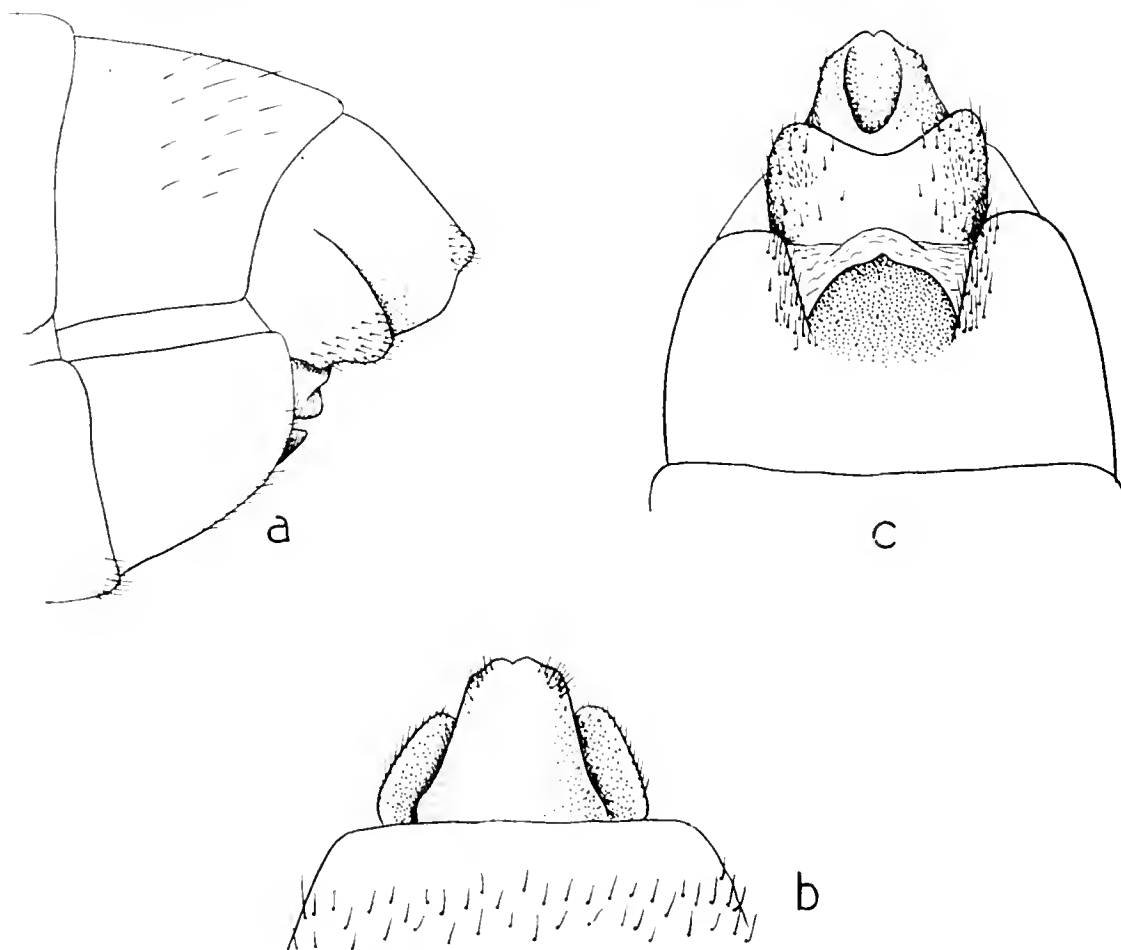


FIG. 72.—*Pycnopsyche antica* Walk. ♀: *a*, genitalia, lateral, *b*, dorsal, *c*, ventral.

As it is impossible to say which published figures and descriptions of *scabripennis* refer to *antica*, it seems best to cite only Walker's original description and Hagen's transfer of the name to synonymy.

***Pycnopsyche divergens* (Walker).**

(Fig. 73.)

- 1852. *Limnephilus divergens* Walker, *partim*, Cat. Neur. Brit. Mus. : 30.
- 1861. *Limnophilus divergens* Hagen, *partim*, Syn. Neur. N. Amer. : 255.
- 1863. *Anabolia divergens* McLachlan, *partim*, Ent. Ann. : 156, 161.

1864. *Stenophylax divergens* Hagen, *partim*, Verh. Zool. Bot. Ges. Wien, **14** : 885.
 1892. *Stenophylax divergens* Banks, *partim*, Trans. Amer. Ent. Soc., **19** : 364.
 1907. *Stenophylax ? divergens* Ulmer, *partim*, Genera Insect., fasc. **60a** : 50.
 1907. *Stenophylax divergens* Banks, *partim*, Cat. Neur. Ins. U.S. : 39.
 1926. *Halesus dan* Sibley, Journ. N.Y. Ent. Soc., **34** : 81.
 1926. *Halesus dan* Sibley, Bul. Lloyd Library, No. 27, Ent. Ser. **5** : 107, pl. 10, fig. 71.
 1934. *Stenophylax divergens* Betten, *partim*, N.Y. State Mus. Bull., **292** : 342.
 1934. *Halesus dan* Betten, N.Y. State Mus. Bull., **292** : 348.
 1934. *Halesus* sp. Betten, N.Y. State Mus. Bull., **292** : 350, pl. 49, figs. 12, 13.
 1935. *Stenophylax dan* Milne, St. N. Amer. Trich., **2** : 33, 52.

Walker describes the species as follows :

“*Testaceus* ; *antennae ferrugineae* ; *alae anticae confertissime tuberculatae, apice subfuscae* ; *alae posticae albidae*.

“Testaceous, clothed with pale hairs : antennae ferruginous : fore-wings very thickly covered with ferruginous tubercles, very pale brown at the tips, with a large tubercle at the base of the third apical areolet : hind-wings whitish. Length of the body 5 lines ; of the wings 16 lines.

“*a, b*. North America. Presented by the Entomological Club.”

To this we add :

Very similar to *Pycnopsyche guttifer* in general appearance except that the brown markings of the *fore wings*, while similarly placed, are more faint and also less in extent ; the brown spot which, in *guttifer*, surrounds the anterior anastomosis is here confined to small patches in the bases of the apical cells, not extending into the discal cell and cell R ; the other brown spot extending from the discal cell through cell M and connecting with the dark posterior margin is narrower than in *guttifer* and approaches a semicircle in shape ; in the type of *divergens* the discal cell is very little longer than its pedicel ; in the type of *guttifer* it is one and one-half times as long ; spurs 1, ?, 3 (legs broken).

Length of the fore wing, male, 18 mm.

Genitalia, male.—The 8th tergite is more strongly chitinized than the others ; apical margin with a round, wide excision, set with jet-black setae excepting for a very small area at the centre, the setae very dense and black at the apical angles ; the sides of the excision are not downwardly produced as in *guttifer* ; parts of the genitalia concealed from above ; from behind, the superior appendages are small, divided to form inner and outer processes, the outer ear-shaped and widely outspread, the inner blackened, set close together to form down-turned, blunt hooks ; penis small and retracted with a pair of fine sheaths ; inferior appendages very broad and heavily fringed at the base, partly welded to the 9th segment and terminating in acute, strongly chitinized, spur-like apices ; a narrow, chitinized band behind the apices of the appendages may form part of an upper penis-cover ; apical margin of the 8th sternite widely excised ; no ventral teeth.

It is possible that the parts that have been described above as the inner

processes of the superior appendages may actually represent intermediate appendages.

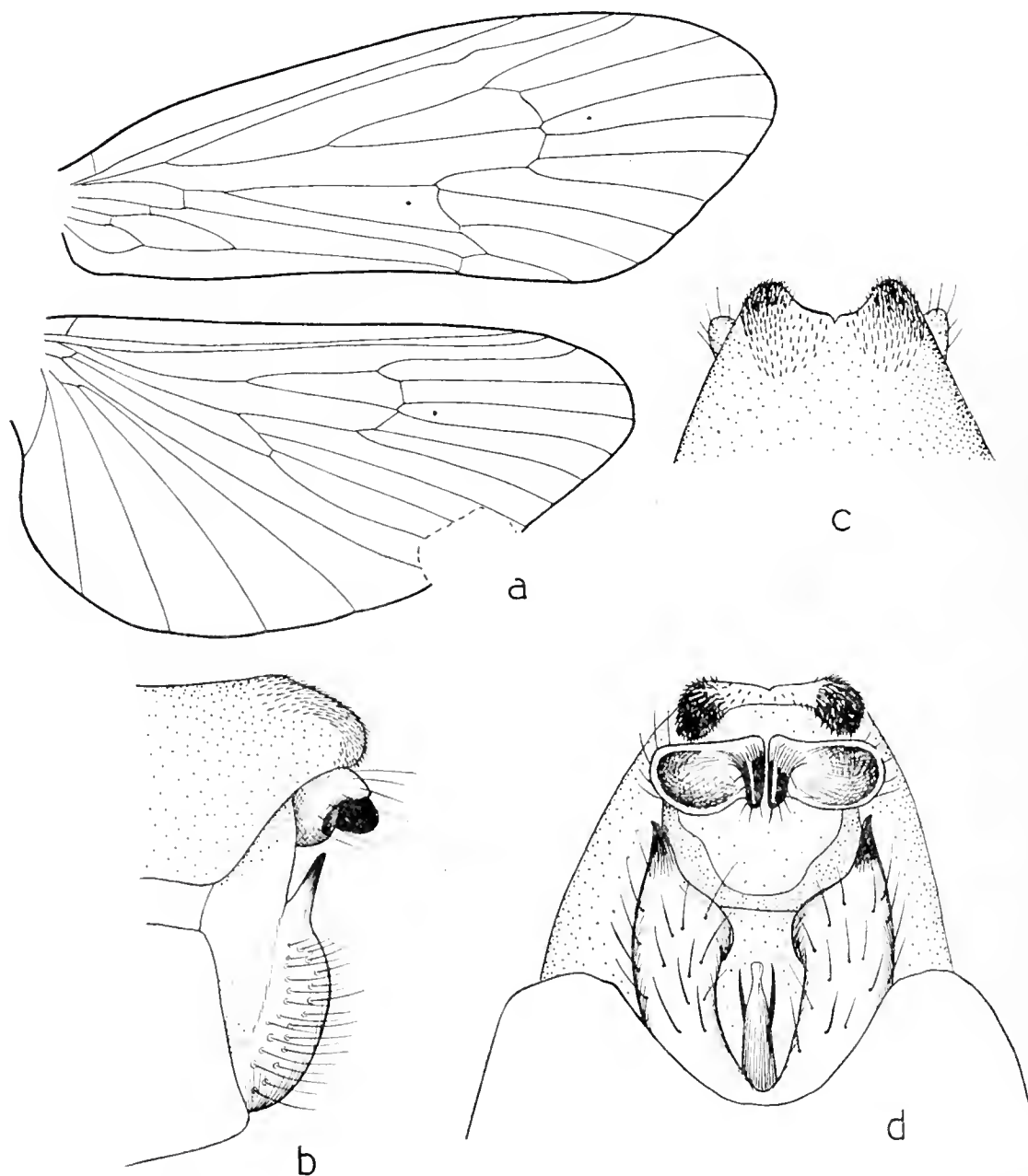


FIG. 73.—*Pycnopsyche divergens* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral and from behind.

We designate as the type of *divergens* the male specimen presented by the Entomological Club. The other specimen listed by Walker under the name "*divergens*" is a female of a distinct species, here described as *Pycnopsyche perplexa*, closely related to *P. antica*.

***Pycnopsyche perplexa* sp. n.**

(Fig. 74.)

1852. *Limnophilus divergens* Walker, *partim*, Cat. Neur. Brit. Mus. : 30.
 1861. *Limnophilus divergens* Hagen, *partim*, Syn. Neur. N. Amer. : 255.
 1863. *Anabolia divergens* McLachlan, *partim*, Ent. Ann. : 156, 161.
 1864. *Stenophylax divergens* Hagen, *partim*, Verh. Zool. Bot. Ges. Wien, **14** : 885.
 1892. *Stenophylax divergens* Banks, *partim*, Trans. Amer. Ent. Soc., **19** : 364.
 1907. *Stenophylax ? divergens* Ulmer, *partim*, Genera Insect., fasc. **60a** : 50.
 1907. *Stenophylax divergens* Banks, *partim*, Cat. Neur. Ins. U.S. : 39.
 1934. *Stenophylax divergens* Betten, *partim*, N.Y. State Mus. Bull., **292** : 342.

Walker describes *Limnophilus divergens* as follows :

“*Testaceus ; antennae ferrugineae ; alae anticae confertissime tuberculatae, apice subfuscae ; alae posticae albidae.*”

“Testaceous, clothed with pale hairs : antennae ferruginous : fore-wings very thickly covered with ferruginous tubercles, very pale brown at the tips, with a large tubercle at the base of the third apical areolet : hind-wings whitish. Length of the body 5 lines ; of the wings 16 lines.

“*a, b.* North America. Presented by the Entomological Club.”

To this we add :

General appearance much like that of *Pycnopsyche antica* W. ; *antennae* lacking and *head* not in good condition for detailed comparison ; *legs* broken, but one spur on the fore leg and two sub-apical spurs on a hind leg indicate that the formula is doubtless 1, 3, 4 ; *fore wings* tuberculated and in general coloured like those of *P. antica* ; the brown stripe running from the discal cell and along the posterior anastomosis is not so dark as in that species, but considerably broader ; the cross-vein of the sector and the cross-vein *rm*, though they have small brown spots adjacent to them, are not continuously margined with brown ; there is no brown spot where the 1st A joins the 2nd and 3rd A, and the brown dots found all over the wing are considerably smaller than in *antica* ; in the fore wing the discal cell is scarcely longer than its pedicel, and in the *hind wing* it is much shorter than its pedicel ; in the hind wing, also, the first branching of the media is clearly before the apex of the discal cell ; in *P. antica* the discal cell is decidedly longer than its pedicel in the fore wing, about equal to the pedicel in the hind wing, and in this wing the branching of the media is beyond the apex of the discal cell.

Length of the fore wing, female, 18 mm.

Genitalia, female.—Dorsal surface of the 8th segment set with short, widely-spaced hairs rather more dense on this segment than on the preceding ones ; the 9th segment, from above, is triangular at the apex, with a small excision at the centre of its apical margin ; the segment is also triangular from the side, with a small angular projection at the base of its lower margin ; vulvar scale (?) with a very broad central lobe with a rounded apex, side-lobes (?) also broad and about twice the length of the central lobe ; no ventral teeth.

The type of this species is a female, one of two specimens described by

Walker as *Limnephilus divergens*; it differs from the other specimen, which is selected as the type of *divergens*, in general appearance and in spur formula.

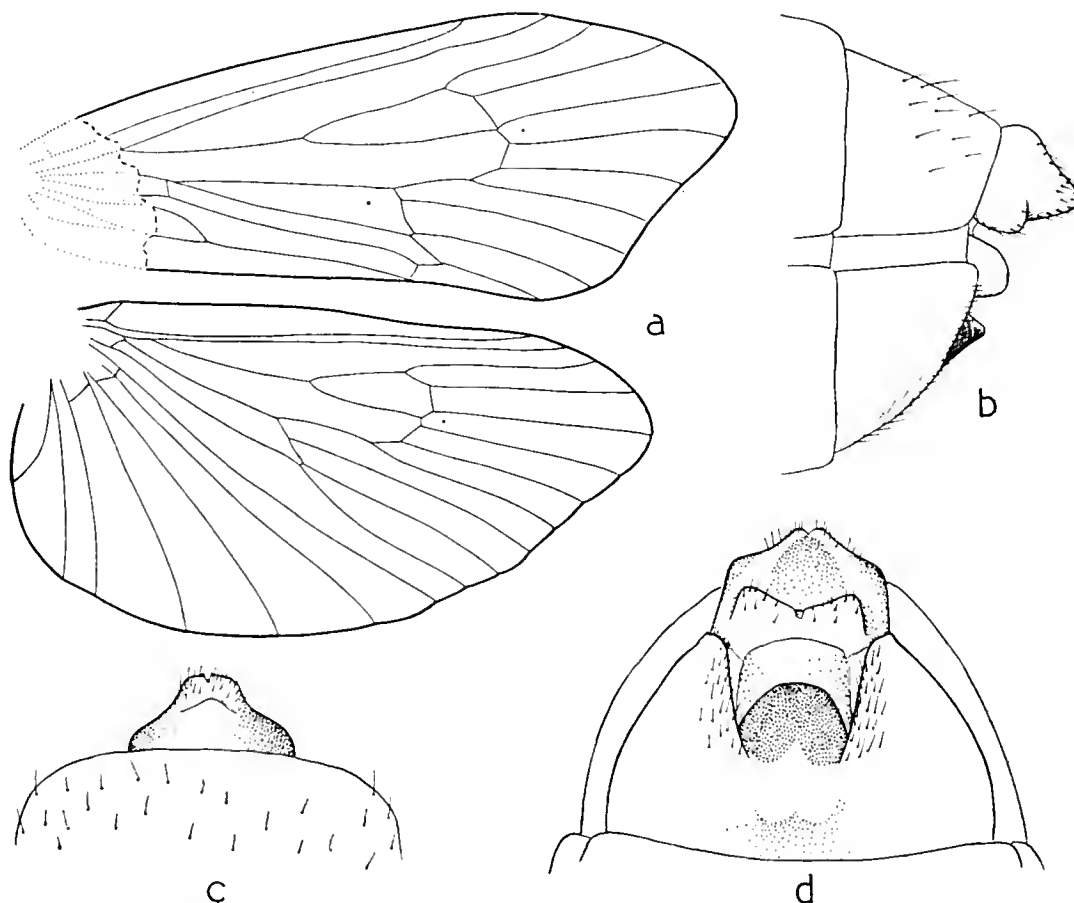


FIG. 74.—*Pycnopsyche perplexa* sp. n. ♀. a, wings; b, genitalia, lateral, c, dorsal, d, ventral.

***Pycnopsyche guttifer* (Walker).**

(Figs. 75, 76.)

- 1852. *Halesus guttifer* Walker, *partim*, Cat. Neur. Brit. Mus. : 16.
- 1861. *Halesus guttifer* Hagen, *partim*, Syn. Neur. N. Amer. : 266.
- 1863. *Halesus guttifer* McLachlan, *partim*, Ent. Ann. : 162.
- 1864. *Halesus guttifer* Hagen, *partim*, Verh. Zool. Bot. Ges. Wien, **14** : 817.
- 1892. *Halesus guttifer* Banks, *partim*, Trans. Amer. Ent. Soc., **19** : 364.
- 1906. *Halesus guttifer* Ulmer, Notes Leyd. Mus., **28** : 24, figs. 30, 31.
- 1907. *Pycnopsyche guttifer* Banks, Proc. Ent. Soc. Wash., **8** : 122, pl. 9, fig. 22.
- 1907. *Pycnopsyche similis* Banks, Proc. Ent. Soc. Wash., **8** : 122, pl. 9, fig. 25.
- 1907. *Halesus guttifer* Ulmer, Genera Insect., fasc. **60a** : 56.
- 1907. *Pycnopsyche guttifer* Banks, Cat. Neur. Ins. U.S. : 38.
- 1915. *Pycnopsyche guttifer* Döhler, Deutsch. Ent. Zeitschr., **1915** : 408.
- 1934. *Halesus guttifer* Betten, N.Y. State Mus. Bull., **292** : 348, pl. 49, figs. 9-11.
- 1934. *Halesus similis* Betten, N.Y. State Mus. Bull., **292** : 349.
- 1935. *Stenophylax guttifer* Milne, St. N. Amer. Trich., **2** : 33 (*similis* reduced to synonymy).
- 1938. *Stenophylax guttifer* Ross, Psyche, **45** : 41 (type of *similis* designated).

Walker describes the species as follows :

"*Testaceus* ; *alae anticae macula una nonnumquam obsoleta subfusca in areolis apicalibus, alteraque in cella discali areola thyridii et cella thyridii, guttaque nigra in areola apicali 3a* ; *alae posticae albidae*."

"*Testaceous* : *antennae ferruginous* : *fore-wings thickly and very minutely tuberculated, with two pale brown spots which are occasionally obsolete, one at the*

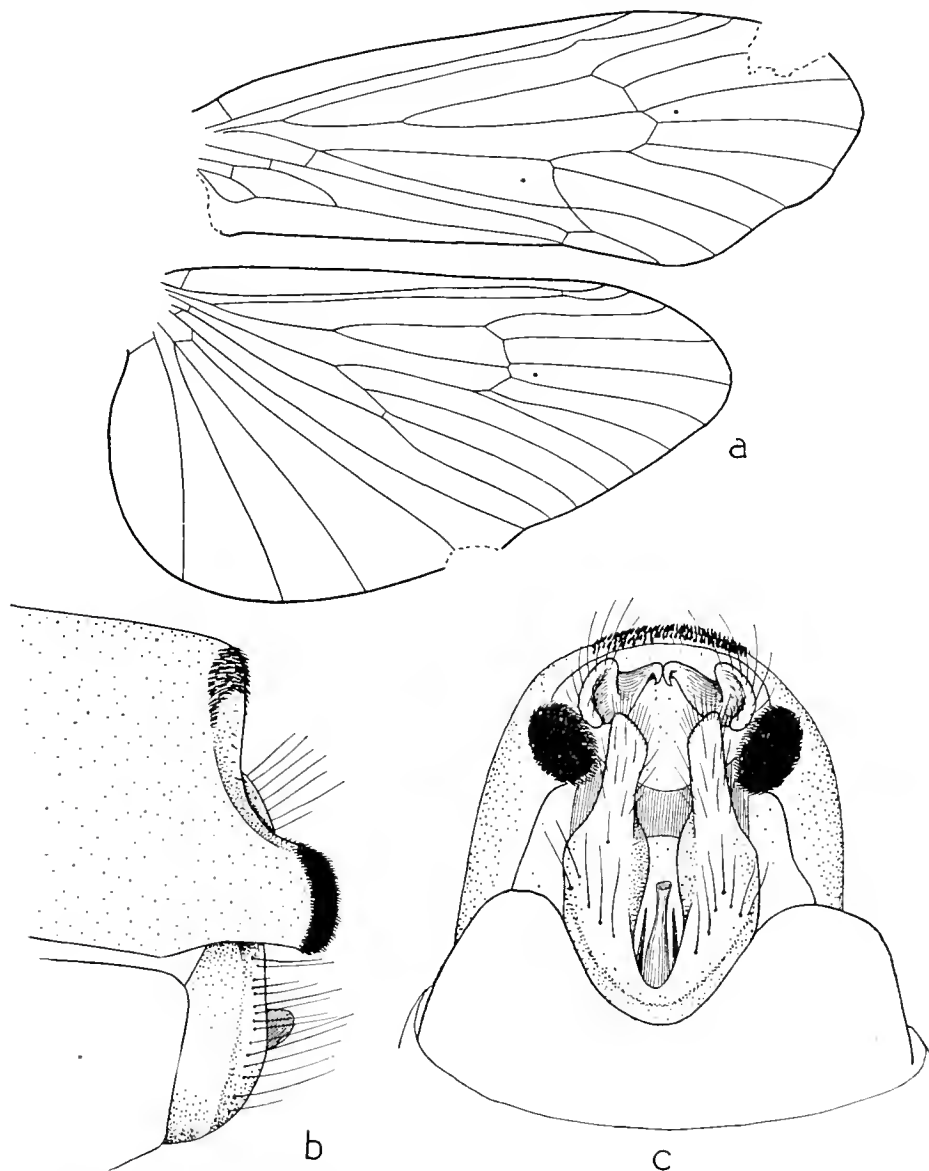


FIG. 75.—*Pycnopsyche guttifer* Walk. ♂ : *a*, wings ; *b*, genitalia, lateral, *c*, from behind.

base of the apical areolets, the other occupying the base of the discal cell, of the areolet of the thyridium, and of the cell of the thyridium ; a black dot near the base of the third apical areolet : hind-wings whitish. Length of the body 5-7 lines ; of the wings 16-20 lines.

"*a-d*. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.

"*e, f*. Georgia. From Mr. Abbot's collection."

To this we add :

Head yellowish brown above, an irregular lighter area at the posterior margin ; some yellowish-brown bristles on tubercles between the ocelli and the antennae and on the posterior margin ; ocelli large, whitish ; face yellow with yellowish-brown hair ; *antennae* and palpi yellowish brown, the antennae broadly ringed with black hair ; pronotum yellow with brown bristles ; mesonotum yellowish brown with a small patch of bristles on each side of the median line ; tegulae a little paler than the mesonotum, covered with brown bristles ; *thorax* beneath and *legs* yellow, the spurs orange, the tibiae and tarsi with black spines ; spurs 1, 3, 3 ; *fore wings* granulated throughout ;

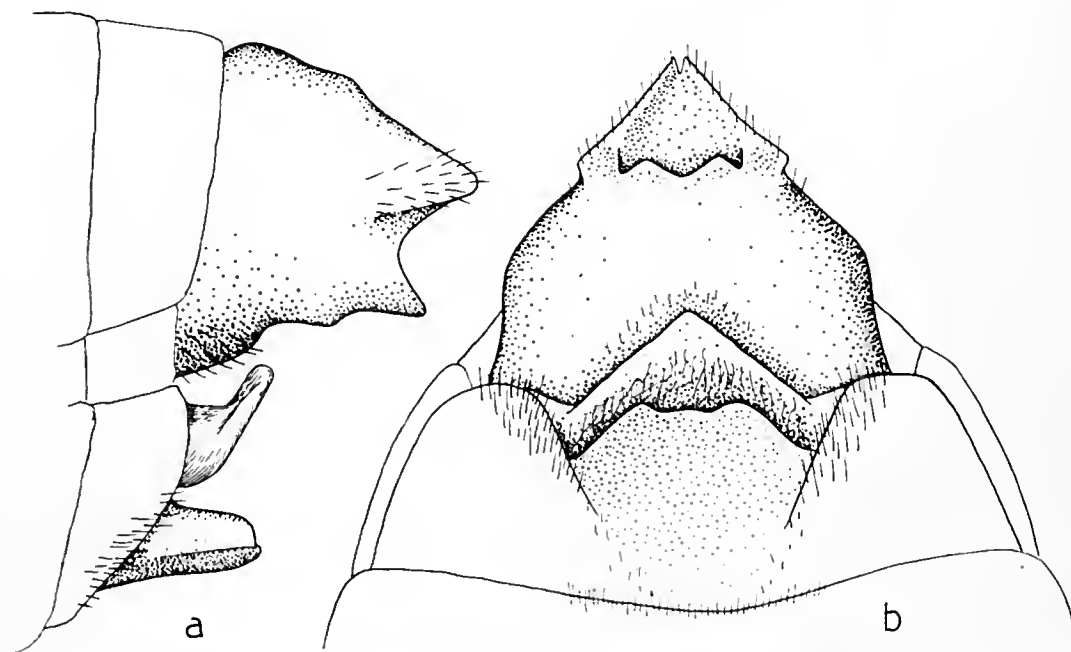


FIG. 76.—*Pycnopsyche guttifer* Walk. ♀: a, genitalia, lateral, b, ventral.

the subapical margin slightly excavated at the tip of M_2 ; sparsely covered with yellow hairs, which are longest on R_1 ; the membrane pale yellow, somewhat darker posterior to Cu_1 ; beginning at R_4 and extending to the tip of the anal veins there is a broad, marginal band of brown, the inner margin of which runs into a point in each apical cell ; there are brown spots in the distal ends of the discal cell and of cell R and on the bases of cells R_3 , R_4 , R_5 and M_1 , these spots surrounding the anterior anastomosis ; another brown spot begins in the distal end of cell M and extends anteriorly through cell R and into the discal cell ; the more distal of these brown areas includes the point in cell R_4 which is very dark ; the more basal brown area includes the similar spot in cell M and also a transparent bulla on vein M ; *hind wings* very finely granulated, transparent ; the first forking of M is at the level of the apex of the discal cell ; *abdomen* dark brown above, yellowish beneath.

Length of the fore wing, male, 17 mm.

Genitalia, male.—The 8th tergite is more strongly chitinized than the others; apical margin deeply and widely excised, set at the centre of the excision with jet-black setae; the base of the excision from above forms a broad, truncate margin; the sides of the segment are produced downwards in a pair of processes, whose truncate apices are also set with black setae, these being much denser than those lining the base of the excision; practically all the parts of the genitalia are retracted and concealed from above; seen from behind, there is a pair of small, ear-shaped superior appendages, whose margins slightly project beyond the 8th segment, from the side; the inner margins of the appendages are produced to make a pair of small hooks directed downwards; penis slender and retracted, with a pair of sheaths with fringed apices; inferior appendages from behind, directed upwards, welded to the 9th segment and somewhat narrowed towards the obliquely truncate apices; there is a plate with an excised upper margin, seen behind the inferior appendages, which may perhaps form part of an upper penis-cover; apical margin of the 8th sternite widely excised; no ventral teeth.

Genitalia, female.—The abdomen terminates, from above, in a small triangle with a minute excision at its apical angle; from beneath, the lower margin of the tubular piece is widely excised; beneath it is a transverse slot, the upper edges showing as a large, triangular flap turned upward against the segment; the lower edge with a strongly chitinized lip at its centre.

Although placed under different species in the British Museum collection, it is possible for us to account for all of the six specimens listed by Walker as *guttifer*.

Of the four recorded as of Barnston's collection, Hudson's Bay, one is the male just described, and this specimen we designate the type of the species, two are females of *P. guttifer*, one of these being described above; the fourth is a male which we ascribe to *Allegophylax lepidus* Hagen. The remaining two are females collected in Georgia; one of them is probably *A. lepidus*; the other is without abdomen, but by its coloration is judged to be possibly *Allegophylax subfasciatus* Say.

Allegophylax lepidus (Hagen).

(Figs. 77, 78.)

- 1852. *Halesus guttifer* Walker, *partim*, Cat. Neur. Brit. Mus. : 16.
- 1861. *Enoicyla lepida* Hagen, Syn. Neur. N. Amer. : 269.
- 1864. *Enoicyla lepida* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 812.
- 1871. *Platyphylax lepidus* McLachlan, Journ. Linn. Soc. Lond., Zool., 11 : 110.
- 1892. *Platyphylax lepida* Banks, Trans. Amer. Ent. Soc., 19 : 364.
- 1907. *Platyphylax lepidus* Ulmer, Genera Insect., fasc. 60a : 54.
- 1907. *Platyphylax lepida* Banks, Cat. Neur. Ins. U.S. : 39.
- 1916. *Allegophylax lepidus* Banks, Can. Ent., 48 : 122.
- 1926. *Platyphylax lepidus* Sibley, Bul. Lloyd Libr., no. 27, Ent. Scr., 5 : 107.
- 1934. *Platyphylax lepidus* Betten, N.Y. State Mus. Bull., 292 : 350, pl. 50, figs. 4-6.
- 1935. *Stenophylax subfasciatus* Milne, *partim*, St. N. Amer. Trich., 2 : 32, 52.
- 1938. *Stenophylax lepidus* Ross, Psyche, 45 : 41 (type-specimen of *lepidus* designated).

Hagen describes *Enoicyla lepida* as follows :

"Luteo-rufous, with luteous hair ; antennae fuscous, annulated with luteous, the basal article luteous ; head and thorax above, rufous ; feet yellowish, with black spines ; spurs yellowish ; anterior wings broader, rugulose, subnude, luteous, with a fuscous point in the base of the third areolet ; veins luteous ; posterior wings luteo-hyaline. Male. Length to tip of wings 15 millim. Alar expanse 28 millim.

"*Hab.*—Pennsylvania."

And Walker describes *Halesus guttifer* as follows :

"*Testaceus ; alae anticae macula una nonnumquam obsoleta subfusca in areolis apicalibus, alteraque in cella discali areola thyridii, et cella thyridii, guttaque nigra in areola apicali 3a ; alae posticae albidae.*

"Testaceous : antennae ferruginous : fore-wings thickly and very minutely tuberculated, with two pale brown spots which are occasionally obsolete, one at the base of the apical areolets, the other occupying the base of the discal cell, of the areolet of the thyridium, and of the cell of the thyridium ; a black dot near the base of the third apical areolet : hind-wings whitish. Length of the body 5-7 lines ; of the wings 16-20 lines.

"*a-d.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.

"*e, f.* Georgia. From Mr. Abbot's collection."

To this we add :

Head brown above, the posterior warts a little lighter, a scant covering of hair, some tawny bristles on the posterior warts ; face brown, with tawny hair ; some darker hair near the margins of the eyes ; a narrow, pale area beneath each antenna ; *antennae* yellowish brown, broadly ringed with darker colour toward the base ; palpi yellow ; pronotum, mesonotum and tegulae yellowish brown with tawny bristles on the warts of the pronotum and on the tegulae ; anteriorly two longitudinal, bristle-bearing warts on the mesonotum ; *legs* yellow with black spines on the tibiae and tarsi ; hind legs wanting, but spurs doubtless 1, 2, 2 ; *fore wings* granulated throughout ; colour faint brownish yellow, almost transparent, slightly deeper brown beyond vein Cu_1 , also a very faint brown spot along cross-vein r-m, and one in cells R and M.

A female, apparently of this species, differs in having the brown spot in cells R and M more clearly shown.

Length of the fore wing, male, 16 mm.

Genitalia, male.—Apical margin of the 8th tergite turned downward so that the apex of the abdomen is flattened or even indented ; the turned-down part is heavily fringed with black setae, which form two groups whose rounded inner margins nearly meet at the centre, leaving a space clear of black setae between (not well shown in the figure) ; superior appendages narrow and prominent ; intermediate appendages small, plate-like, close together, with small triangular processes arising from their laterally produced bases ; inferior appendages long, welded at their bases to the 9th sternite, their apices hook-shaped, directed upward and forwards so that they cover the intermediate

appendages; a small angular projection on each outer margin about two-thirds of the way towards the apex; penis small, sheaths terminating in a pair of fine spines (one wanting on one sheath); no ventral process.

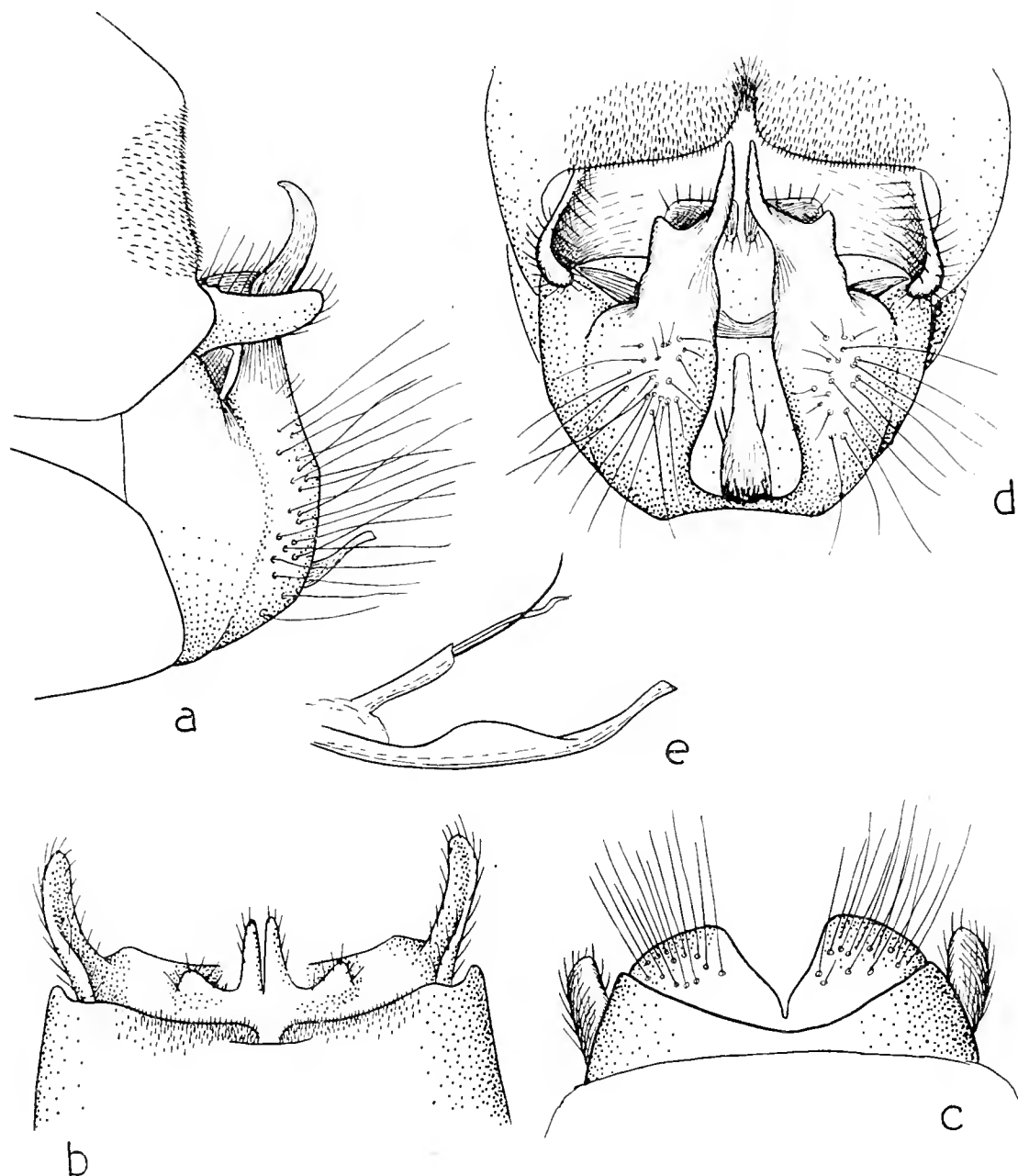


FIG. 77.—*Allegophylax lepidus* Hagen ♂: *a*, genitalia, lateral; *b*, margin of the 8th tergite, superior and intermediate appendages; *c*, genitalia, ventral, penis omitted, *d*, the same, from behind; *e*, penis and sheath, lateral.

Genitalia, female.—The abdomen, from above, terminates in a small, truncate cone with the centre of the apical margin produced in a wide triangle with a longitudinal ridge from its excised apex to the base; from beneath,

the lower margin of the tubular piece is excised with a triangular excision ; beneath this is a transverse slot, the upper edge turned upward and triangular ; the lower, with a strongly chitinized lip at its centre.

The male and female specimens described above as *Allegophylax lepidus* Hagen were among Walker's types of *Halesus* (*Pycnopsyche*) *guttifer*. The male was collected in the Hudson's Bay region by Barnston. The female is of Abbot's collection in Georgia, and while it appears very similar to the male,

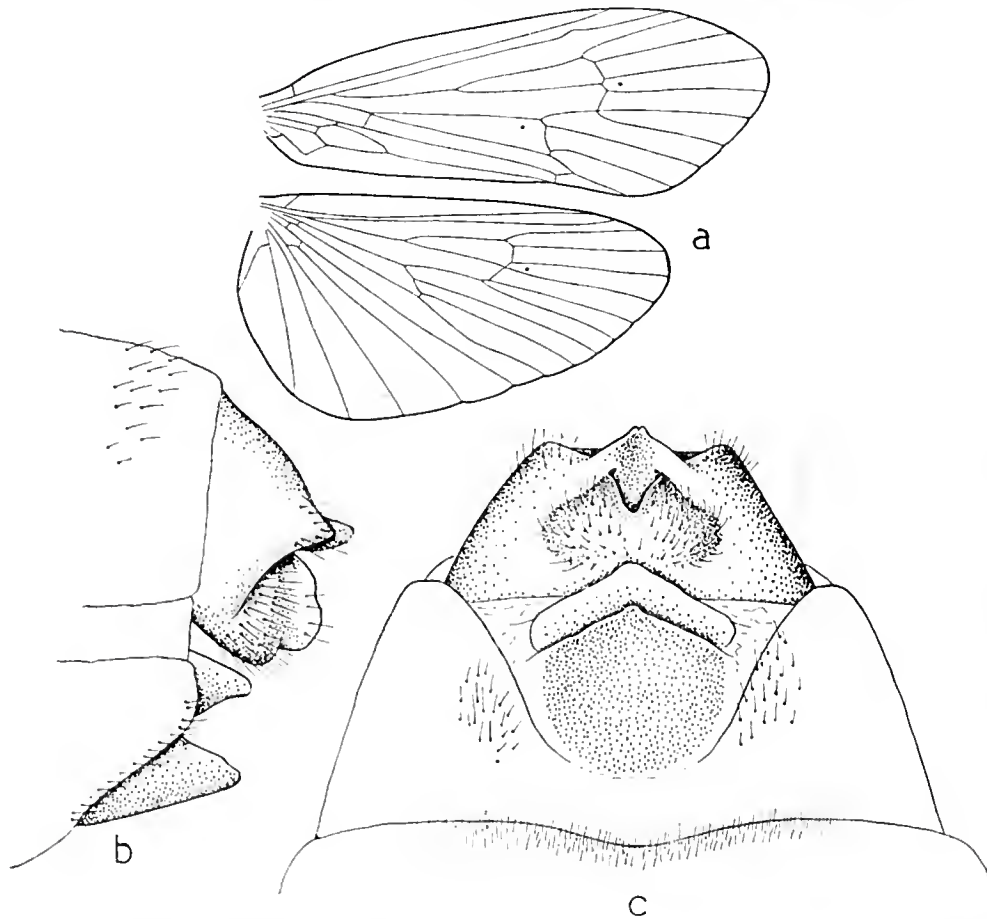


FIG. 78.—*Allegophylax lepidus* Hagen ♀: *a*, wings; *b*, genitalia, lateral. *c*, ventral.

the geographical separation makes us regard its assignment to the same species as only provisional.

We place the species in *Allegophylax*, the genus which Banks erected for it and for *Platyphylax subfasciatus* Say, in agreement with McLachlan's and Hagen's opinions that their retention in *Platyphylax* is not warranted.

Milne (1935) united *Allegophylax* and *Pycnopsyche* with the European genus *Stenophylax*. The characters of these various genera are in need of clearer definition.

Reference may be made here to Walker's remaining specimen, not dealt with above, included by him under *Halesus guttifer* (*e* or *f*), a female without

abdomen. This specimen may possibly represent *Allegophylax subfasciatus* Say, but it is not so clearly distinct in its coloration from the other female in the same collection (referred to above as probably *Allegophylax lepidus*) as to merit separate description.

Platycentropus indicans (Walker).

(Fig. 79.)

- 1852. *Limnophilus indicans* Walker, Cat. Neur. Brit. Mus. : 23.
- 1859. *Halesus maculipennis* Kolenati, Gen. et Spec. Trich., pt. 2 : 176, 280.
- 1861. *Limnophilus indicans* Hagen, Syn. Neur. N. Amer. : 258.
- 1861. *Halesus hostis* Hagen, Syn. Neur. N. Amer. : 266.
- 1863. *Halesus indicans* McLachlan, Ent. Ann. : 157, 162.
- 1864. *Halesus indicans* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 817.
- 1864. *Halesus maculipennis* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 818 (suggests it may be *indicans* Walker).
- 1892. *Halesus indicans* Banks, Trans. Amer. Ent. Soc., 19 : 364.
- 1892. *Halesus maculipennis* Banks, Trans. Amer. Ent. Soc., 19 : 364.
- 1905. *Platycentropus maculipennis* Ulmer, Stett. Ent. Zeit., 66 : 13, pl. 1, figs. 9, 10.
- 1907. *Halesus indicans* Ulmer, Genera Insect., fasc. 60a : 56.
- 1907. *Platycentropus maculipennis* Ulmer, Genera Insect., fasc. 60a : 57, pl. 5, figs. 36a, b, pl. 34, fig. 3 (*hostis* listed as a synonym).
- 1907. *Platycentropus maculipennis* Banks, Cat. Neur. Ins. U.S. : 38.
- 1907. *Halesus indicans* Banks, Cat. Neur. Ins. U.S. : 38.
- 1908. *Platycentropus maculipennis* Banks, Psyche, 15 : 64.
- 1926. *Platycentropus maculipennis* Sibley, Bull. Lloyd Libr., no. 27, Ent. Ser., 5 : 106.
- 1934. *Halesus indicans* Betten, N.Y. State Mus. Bull., 292 : 349.
- 1934. *Platycentropus maculipennis* Betten, N.Y. State Mus. Bull., 292 : 358, text-figs. 5s, 6c, 43a, pl. 51, figs. 9-11.
- 1935. *Platycentropus maculipennis* Milne, St. N. Amer. Trich., 2 : 37, 52.
- 1936. *Platycentropus indicans* Milne, St. N. Amer. Trich., 3 : 60 (*maculipennis* reduced to synonymy).
- 1938. *Platycentropus hostis* Ross, Psyche, 45 : 41 (lectotype of *hostis* fixed).

Walker describes the species as follows :

"*Ferrugineus ; palpi et pedes testacei ; alae anticae testaceae, albido marginatae, vitta discali brevi alba apud medium contracta apice quinque-digitata.*

"*Ferruginous : antennae paler : palpi and legs testaceous : fore-wings testaceous, deeply and irregularly whitish round the border ; disk with a short white stripe which is slender in the middle and towards the tip forms five rays, the middle one longest : hind-wings whitish. Length of the body 5 lines ; of the wings 18 lines.*

"*a, b. Georgia. From Mr. Abbot's collection.*"

To this we add:

Head very dark reddish brown above, the central, somewhat raised area ending anteriorly in a pair of blunt processes covered with brown bristles, the bristles on the posterior warts darker ; face yellowish, with black hair mostly at the margins of the eyes ; *antennae* brownish yellow, the basal joint with pale hair ; palpi brownish yellow ; pronotum and mesonotum dark reddish brown ; legs and spurs brownish yellow, the inner spur of the hind leg very

broad, the tibiae and tarsi with black spines; *fore wings* finely granulated, colour pale, transparent yellow, with a conspicuous brown area in the centre of the wing extending roughly from R_2 to the 1st A and reaching the posterior margin at the tips of the anal veins; the brown colour also extends con-

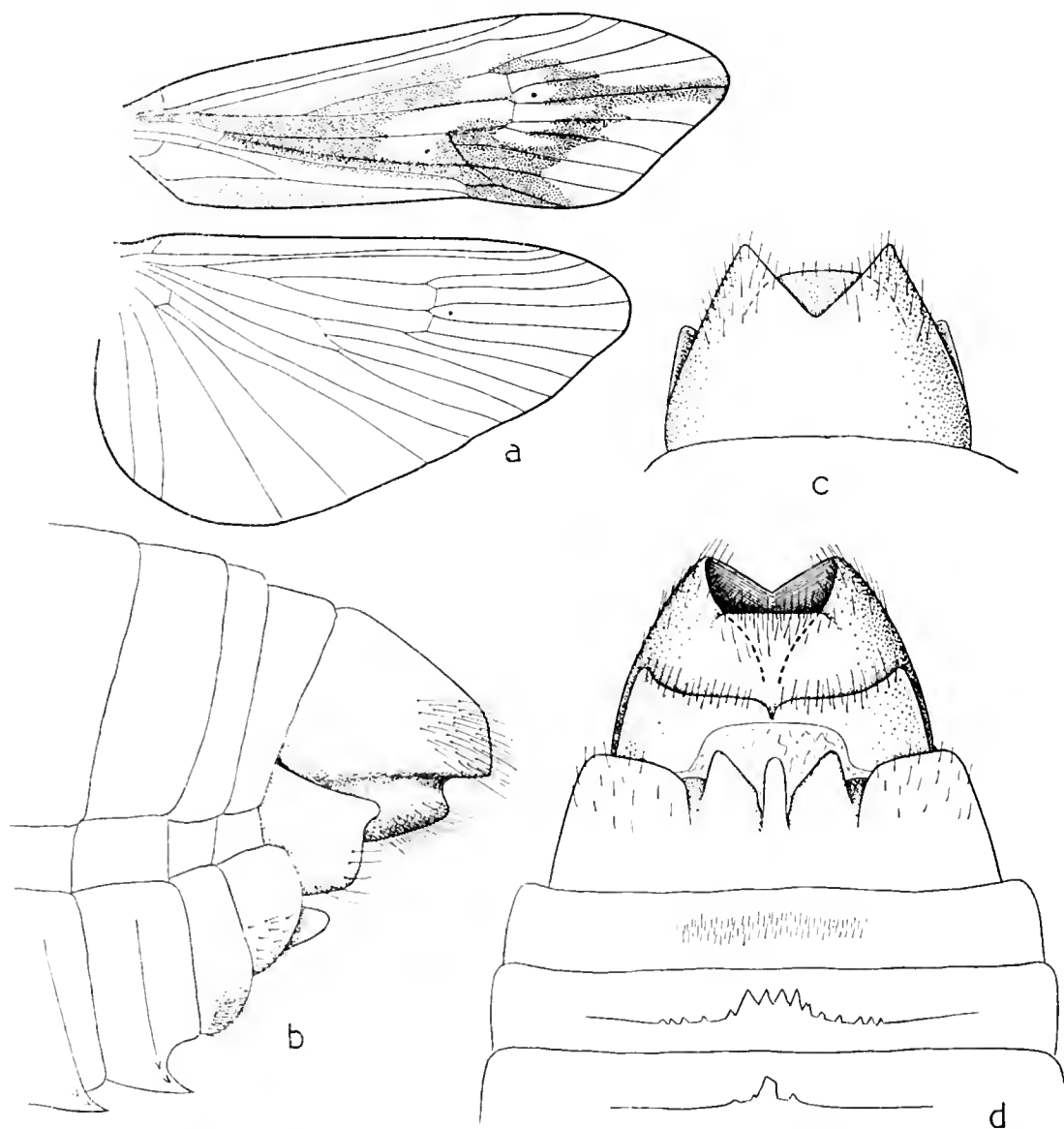


FIG. 79.—*Platycentropus indicans* Walk. ♀: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

spicuously along R_5 to the apical margin; enclosed in the large, brown area are transparent spots in cells R, M, R_3 , R_4 , R_5 , M_1 and M_2 ; in the *hind wing* the first branching of M is beyond the base of the discal cell; *abdomen* brown above, paler beneath.

Length of the fore wing, 18 mm.

Genitalia, female.—The terminal dorsal segment forms a strongly chitinized

tubular piece which is deeply excised to make a pair of broad triangles side by side ; seen from the side, the tubular piece is also triangular, apex deeply notched beneath, with a small process below it whose distal margin is convex and produced towards its upper part in a small triangular process ; from beneath, the tubular piece is bounded by a truncate lip ; the small process mentioned above appears as a pair of plates with the outer angles slightly produced distally, and the inner approaching each other and nearly meeting ; these plates possibly form the margin of one of the sternites ; vulvar scale with the outer lobes much wider and a little longer than the inner ; there is a coronet of strong spines or teeth, flanked by a series of smaller teeth, decreasing in size from the centre, on the middle of the 6th sternite and a less complete series on the 5th.

There are two female specimens apparently of the same collection ; we designate the darker one, with the abdomen mounted in balsam, as the type.

Platycentropus indistinctus (Walker).

(Fig. 80.)

- 1852. *Limnephilus indistinctus* Walker, Cat. Neur. Brit. Mus. : 37.
- 1861. *Halesus amicus* Hagen, Syn. Neur. N. Amer. : 265.
- 1861. *Halesus indistinctus* Hagen, Syn. Neur. N. Amer. : 266.
- 1863. *Halesus indistinctus* McLachlan, Ent. Ann. : 157, 162 (*amicus* Hagen listed as probably a synonym).
- 1864. *Halesus amicus* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 817 (listed as possibly a synonym).
- 1864. *Halesus indistinctus* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 817.
- 1877. *Halesus indistinctus* Provancher, Le Nat. Can., **9** : 259.
- 1878. *Halesus indistinctus* Provancher, Petite Faun. Ent. Can., **2** : 134.
- 1892. *Halesus indistinctus* Banks, Trans. Amer. Ent. Soc., **19** : 364.
- 1907. *Halesus amicus* Ulmer, Genera Insect., fasc. **60a** : 56.
- 1907. *Halesus indistinctus* Ulmer, Genera Insect., fasc. **60a** : 56.
- 1907. *Halesus indistinctus* Banks, Cat. Neur. Ins. U.S. : 38.
- 1908. *Halesus indistinctus* Banks, Psyche, **15** : 64.
- 1916. *Hylepsyche indistinctus* Banks, Can. Ent., **48** : 121.
- 1934. *Platycentropus indistinctus* Betten, N.Y. State Mus. Bull., **292** : 357. pl. 51, figs. 4-8.
- 1935. *Platycentropus amicus* Milne, St. N. Amer. Trich., **2** : 38, 52.
- 1935. *Platycentropus indistinctus* Milne, St. N. Amer. Trich., **2** : 38, 52.
- 1938. *Platycentropus amicus* Ross, Psyche, **45** : 41 (type of *amicus* designated).

Walker describes the species as follows :

“*Testaceus ; caput et thorax ferruginea ; alae anticae vitta lata postica strigaeque apud areolas 4am et 5am subapicales subfuscis.*”

“Testaceous : head and thorax ferruginous : antennae pale ferruginous : forewings pale testaceous, with a broad very pale brown stripe along the hind-border, with a line of the same colour on the vein between the fourth and fifth subapical areolets, and with a white spot on the thyridium. Length of the body 4 lines ; of the wings 13 lines.

“*a.* Newfoundland. Presented by W. C. St. John, Esq.”

To this we add :

Head dark brown above, posterior warts yellowish, some brown bristles on the posterior warts and in small pale spots between the antennae ; ocelli yellow ; face, palpi and *antennae* brownish yellow, with hairs of about the same colour ; pronotum and mesonotum brown, the warts of the pronotum

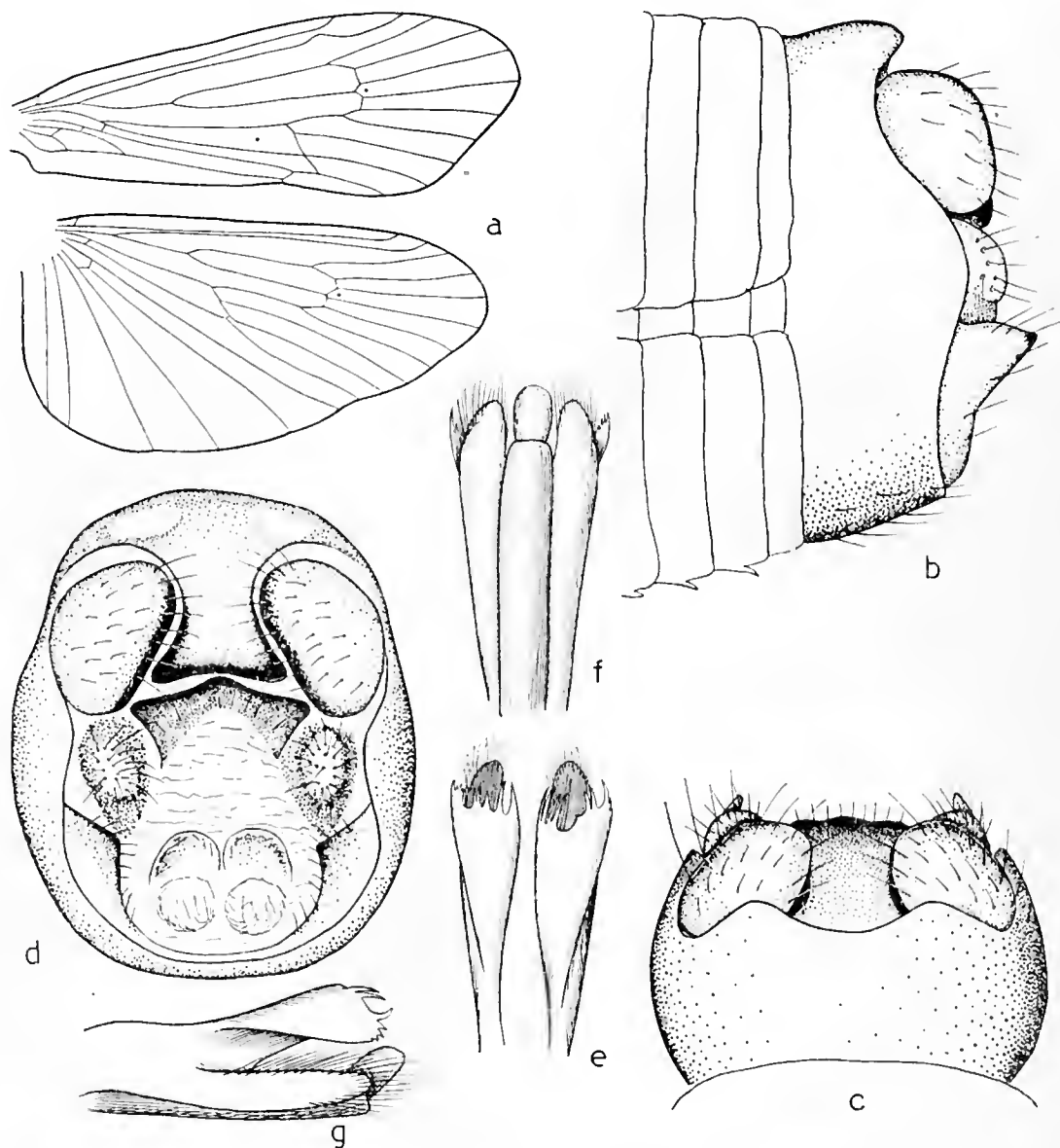


FIG. 80.—*Platycentropus indistinctus* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, from behind; *e*, penis sheaths, dorsal, *f*, penis and sheaths, ventral, *g*, lateral.

paler and covered with black bristles ; *legs* and spurs brownish yellow, the tibiae and tarsi with black spines ; inner spurs of the hind tibiae, male, very large ; *wings* finely tuberculated, fore wing pale, transparent yellow, with a brown stripe which runs through the posterior part, darkest along the length of Cu, but including also cells M, M₄ and Cu_{1a} ; the corneous spot of cell M

and the adjoining bulla on vein M show conspicuously in the brown stripe ; a narrow, brown line runs along R₅, and the apical margin posterior to that vein is broadly but faintly marked with brown ; as in *P. indicans*, the 2nd A of the fore wing is joined to the 1st A rather than to the 3rd A.

Length of the fore wing, male, 14 mm.

Genitalia, male.—Apical margin of the 9th dorsal segment widely excised ; beneath the excision the margin is produced in a large dorsal plate directed downward across the end of the abdomen ; apical margin truncate, wider than the base, blackened particularly at the angles ; superior appendages rounded, margins blackened ; beneath the dorsal plate, seen from behind, is a crown-shaped upper penis-cover (?) with blackened upper margin ; intermediate appendages (?) small, rounded and membranous, covered with widely scattered, long hairs ; penis with a pair of bifurcate sheaths, the upper forks trough-like, with serrate apices ; inferior appendages small and triangular from the side ; ventral processes to the 5th, 6th and 7th segments all of about the same size.

There is a single type-specimen, a male.

While we have listed *P. amicus* Hagen in the synonymy, the question of its being identical may be regarded as a matter for further determination. Neither McLachlan nor Hagen was altogether positive about it, and Milne evidently regards the two forms as distinct. By the key given by Milne (1935) Walker's *indistinctus* would run to *amicus*, and further comparison therefore seems to be needed.

Hesperophylax designatus (Walker.)

(Fig. 81.)

- 1852. *Limnephilus designatus* Walker, Cat. Neur. Brit. Mus. : 24.
- 1861. *Enoicyla designata* Hagen, Syn. Neur. N. Amer. : 269.
- 1863. *Enoicyla designata* McLachlan, Ent. Ann. : 162.
- 1864. *Enoicyla designata* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 812.
- 1871. *Platyphylax designatus* McLachlan, Journ. Linn. Soc. Lond., Zool., 11 : 110.
- 1892. *Platyphylax designatus* Banks, Trans. Amer. Ent. Soc., 19 : 364.
- 1906. *Platyphylax designatus* Ulmer, Notes Leyd. Mus., 28 : 20, figs. 23-29.
- 1907. *Platyphylax designatus* Ulmer, Genera Insect., fasc. 60a : 54, pl. 33, fig. 8.
- 1907. *Platyphylax designata* Banks, Cat. Neur. Ins. U.S. : 39.
- 1908. *Platyphylax designata* Banks, Trans. Amer. Ent. Soc., 34 : 265, pl. 19, fig. 15.
- 1909. *Platyphylax designatus* Vorhies, Trans. Wisc. Acad. Sci., 16 : 672, pl. 55, figs. 21-23.
- 1916. *Hesperophylax designatus* Banks, Can. Ent., 46 : 122.
- 1926. *Hesperophylax designatus* Sibley, Bull. Lloyd Libr., no. 27, Ent. Ser., 5 : 107.
- 1934. *Hesperophylax designatus* Betten, N.Y. State Mus. Bull., 292 : 361, pl. 52, figs. 11-13, pl. 53, fig. 1.
- 1935. *Hesperophylax designatus* Milne, St. N. Amer. Trich., 2 : 26, 51.

Walker describes the species as follows :

“ *Testaceus ; thorax fusco bivittatus ; abdomen fuscum ; alae anticae vitta sericea alba interrupta et apicem versus dilatata.*

"Testaceous, clothed with testaceous hairs: thorax with two brown stripes: abdomen brown: fore-wings with a silky white discal stripe which is interrupted beyond the middle, dilated and irregular towards the tip: hind-wings whitish. Length of the body 7 lines; of the wings 18 lines.

"*a, b.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.

"*c.* North America. Presented by the Entomological Club.

"*d, e.* Arctic America. District watered by the Mackenzie and Slave Rivers. Presented by Sir John Richardson.

"*f.* Great Bear Lake. Presented by Sir John Richardson.

"*g.* Nova Scotia. From Lieut. Redman's collection."

To this we add:

Head yellow above except a brown lunate wart at the posterior margin of each eye; on each side of the median line there is a broad stripe of heavy yellow pubescence; the posterior warts also are covered with yellow hair, but the warts adjoining the eyes have the hair somewhat darker; face yellow with yellow hair, some black hair near the eyes; *antennae* (broken) with the basal joint covered with yellow hair; palpi brownish yellow; pronotum with two large yellow warts covered with long, yellow hair; mesonotum dark brown with two anterior longitudinal stripes of yellow hair; tegulae with long, yellow bristles; *legs* yellow, the tibiae and tarsi with black spines; spurs 1, 2, 2; *fore wings* yellowish with brown and silver-white longitudinal stripes, the veins brown, rather prominent in the apical part of the wing; the very striking silvery-white stripes are located as follows: a very long one in the anterior part of cell M, two shorter ones in cell R₃ bordering vein R₄ at the base of the cell and at the wing margin; one in the base of cell M₁, and a small dot near the base of cell M₂; cells R₄ and R₅ are largely filled with yellow stripes, the one in cell R₅ bordered narrowly with silvery white; the brown areas include chiefly the parts of cells M, R₂, M₁ and M₂ not occupied by the silvery-white pubescence.

Length of the fore wing, male, 17 mm.; female, 17 mm.

Genitalia, male.—Apical margin of the 8th tergite deeply but not very heavily clothed with fine, dark setae arranged mostly in two patches; superior appendages from above, long, slightly curved, parallel-sided; from the side, triangular; below is an upper penis-cover arising from a very large base extending right across the segment, apex produced in a stout process directed upwards, rounded from above; penis curving upwards, apex dilated and excised; sheaths bifurcate, upper forks each bearing at its apex as seen from beneath, a fan of outwardly-curving spines, with serrate upper margin, the lower forks rather shorter than the upper, not curving outwards but straight, possibly bifurcate, each fork consisting of a bundle of spines, each with a pair of teeth at its apex; inferior appendages from the side, slender, tapering from the base to a subacute apex which almost touches the apex of the superior appendage; from beneath, inner margins produced at their bases in shallow, rounded plates; no ventral teeth.

The single male collected at the Great Bear Lake was designated as the type by Ulmer in 1906. As the type is in poor condition, the figures we give have been drawn partly from this specimen, and partly from a male paratype (*a* or *b*) collected in the Hudson's Bay region. The dorsal and lateral figures

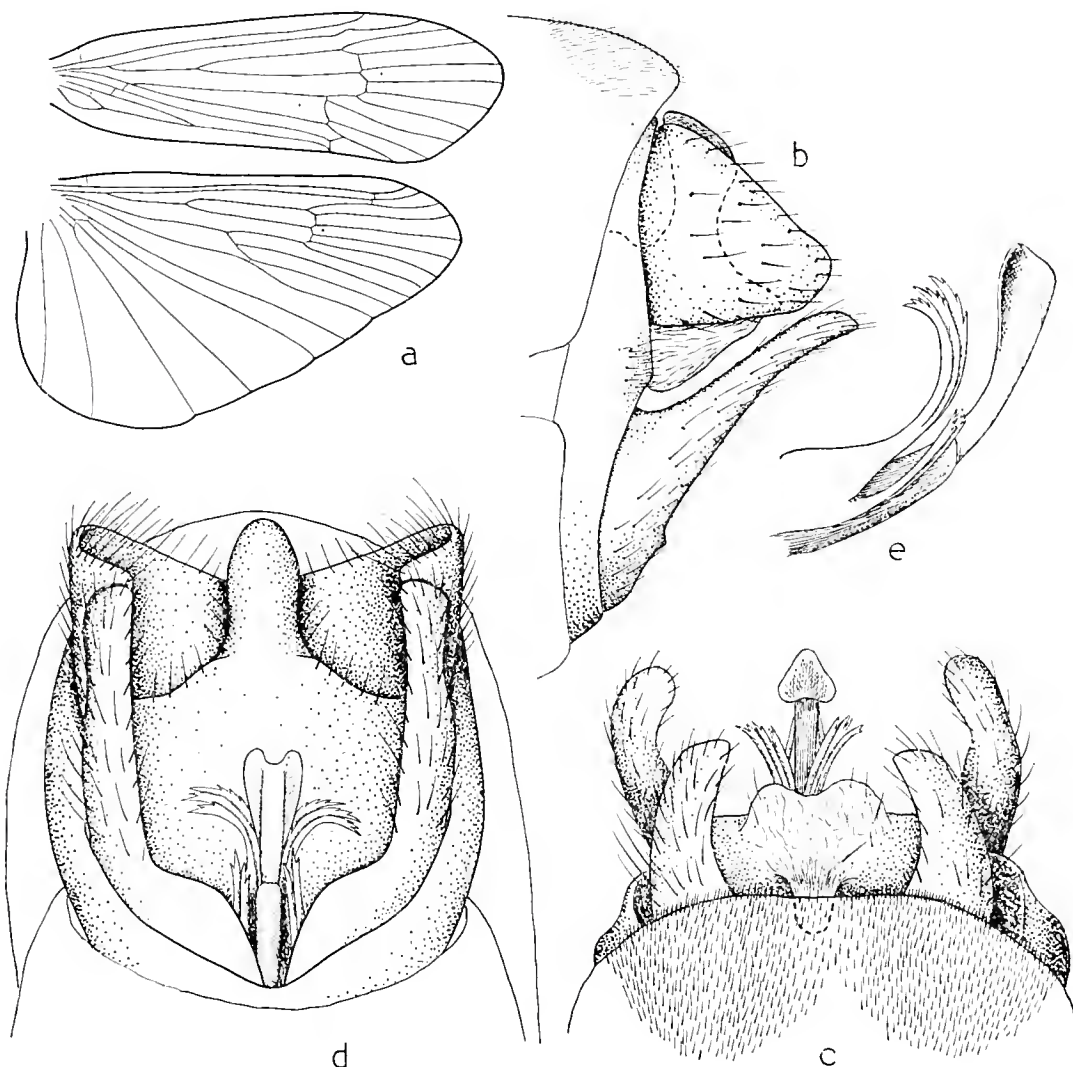


FIG. 81.—*Hesperophylax designatus* Walk. ♂: *a*, wings (from a paratype); *b*, genitalia, lateral (type), *c*, dorsal (type), *d*, from behind (paratype); *e*, penis and sheaths, lateral.

of the genitalia are from the type; other aspects of the genitalia and the wings are from the Hudson's Bay insect.

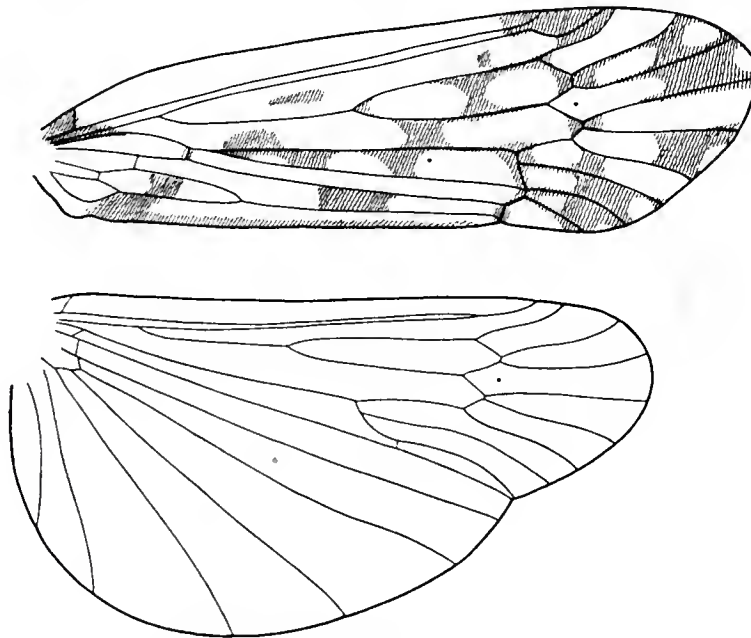
Walker's specimen *c* lacks the abdomen, but agrees with the Hudson's Bay insect in coloration, except that cells R_4 and R_5 are almost wholly filled with silvery-white instead of pale yellow pubescence; this specimen is a female.

The males from Arctic America (*d* and *e* of Walker) are also in poor condition. Two specimens, *g*, and either *a* or *b*, are missing.

Chilostigma areolatum (Walker).

(Fig. 82.)

1852. *Limnephilus areolatus* Walker, Cat. Neur. Brit. Mus. : 35.
 1861. *Enoicyla areolata* Hagen, Syn. Neur. N. Amer. : 267.
 1863. *Enoicyla areolata* McLachlan, Ent. Ann. : 162.
 1864. *Enoicyla areolata* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 812.
 1880. *Chilostigma areolatum* McLachlan, Rev. and Syn. Trich., Suppl., pt. 2 : xliii.
 1892. *Enoicyla areolata* Banks, Trans. Amer. Ent. Soc., 19 : 364.
 1907. *Chilostigma areolatum* Ulmer, Genera Insect., fasc. 60a : 70.
 1907. *Platyphylax areolata* Banks, Cat. Neur. Ins. U.S. : 39.
 1934. *Chilostigma areolatum* Betten, N.Y. State Mus. Bull., 292 : 366.
 1935. *Glyphopsyche areolatus* Milne, St. N. Amer. Trich., 2 : 24, 50.

FIG. 82.—*Chilostigma areolatum* Walk. : wings.

Walker describes the species as follows :

"*Cinereo-niger* ; *tibiae obscure ferrugineae* ; *alae anticae albidae, areolis fusco fasciatis*.

"Black, with a slight gray tinge, clothed with black hairs : shanks dark ferruginous : wings whitish : veins black ; most of the areolets of the fore-wings with brown bands which are broadest at the tips ; borders fringed. Length of the body 2 lines ; of the wings 6 lines.

"*a. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.*"

To this we add :

Head (lacking) : pronotum dark brown, with two large warts bearing brown bristles ; mesonotum dark brown, with two small areas on either side of the median line anteriorly, from which bristles have apparently been rubbed ;

tegulae somewhat lighter brown, with black bristles; *thorax* beneath and the *legs* dark brown, the tibiae and tarsi a little lighter and with a few black spines; *fore wings* white, with brown markings, the veins brown; there is a very scant covering of black hair, which is heavier on the veins; the fringe, while not dense, is rather long and conspicuous; the more prominent brown spots are located as follows: one at the pterostigma, two, rather faint, in cell R_1 , one in the discal cell, one in cell 1st A, one each on the cross-vein of the sector, cross-vein r-m and cross-vein m-cu, one each also in cells R_3 , R_4 , M_1 , M_2 , M_4 and Cu_{1a} ; altogether the brown area is less than the white; *hind wings* white, transparent, the veins brown; in both the fore and the hind wing the cross-vein of the sector and the cross-vein r-m are very short; *abdomen* lacking; fore legs also lacking; sex unknown.

Length of the fore wing, 7 mm.

Of the single type of this species there remain only the wings and parts of the middle and hind legs. Perhaps the striking coloration of the wings (reminding one of certain Panorpidae) may permit fairly certain identification of this insect when further collections are made.

It is not possible to indicate the sex of the type, or to state whether the spurs are in any way peculiar.

Frenesia gen. n.

Antennae moderately stout, the basal joint not as long as the head; maxillary palpi with the 2nd joint slightly longer than the 3rd in the male, equal to the 3rd or the 5th in the female; 2nd and 3rd joint of the labial palpi very broad; 1st joint of the tarsus of the fore leg much longer than the 2nd in both sexes; tibia of the fore leg of the male with a comb of short, black spines along the inner margin, the femur with a groove to receive the tibia, the groove not set with spines; spurs 1, 2, 2; the spur of the fore leg of the male long, sharply bent at the tip, set upon a prominence at the end of the tibia; fore wings somewhat granulose, the stigma coarsely tuberculate; the wing greatly widened before its apex, the greatest width being equal to at least one-third of the wing length; costal margin distinctly rounded; discal cell longer than its pedicel in about the proportion 5 : 3; Sc and R_1 curved in the region of the stigma; the cross-vein of the sector and cross-vein r-m both long; in the hind wing the stigma is well marked; the first branching of the media is not more than one-fifth of the length of the discal cell beyond the base of that cell.

We make Walker's *Limnephilus difficilis*, generally listed in *Chilostigma*, the type of this genus. Walker's *Limnephilus praeteritus* and the species described by Milne as *Chilostigma missum* will also find place here.

The genus *Frenesia* is like *Chilostigma* in respect of the stigma of the fore wing and in the course of Sc and R_1 ; it is sufficiently distinguished from *Chilostigma* by the shape of the fore wing, the proportionate lengths of the palpal joints, and particularly by the structure of the fore leg of the male.

Frenesia difficile (Walker).

(Fig. 83.)

1852. *Limnephilus difficilis* Walker, Cat. Neur. Brit. Mus. : 34.
 1861. *Enoicyla difficilis* Hagen, Syn. Neur. N. Amer. : 268.
 1863. *Enoicyla difficilis* McLachlan, Ent. Ann. : 158, 162.
 1864. *Enoicyla difficilis* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 812.
 1878. *Chilostigma difficile* Lintner, N.Y. Comm. Fisheries, Append. 10th Ann. Rep., Senate Documts., no. 32 : 85, pl. 5, fig. 2.
 1892. *Cryptothrix difficilis* Banks, Trans. Amer. Ent. Soc., 19 : 364.
 1907. *Chilostigma difficile* Ulmer, Genera Insect., fasc. 60a : 70, pl. 8, figs. 64a, b ; pl. 34, fig. 7.
 1907. *Chilostigma difficile* Banks, Cat. Neur. Ins. U.S. : 40.
 1915. *Chilostigma difficile* Lloyd, Journ. N.Y. Ent. Soc., 23 : 208, fig. 12.
 1926. *Chilostigma difficile* Sibley, Bull. Lloyd Libr., no. 27, Ent. Ser., 5 : 108, pl. 13, fig. 106.
 1934. *Chilostigma difficile* Betten, N.Y. State Mus. Bull., 292 : 367, pl. 53, figs. 8-10 ; pl. 54, fig. 1.
 1935. *Chilostigma difficile* Milne, St. N. Amer. Trich., 2 : 35, 50 (lists *Platyphylax coagulatum* Hagen and *C. pallidum* Banks as synonyms).

Walker describes the species as follows :

"*Testaceus ; antennae fuscae, articulis 1o ad et 2o omnino sequentibusque basi testaceis ; alae anticae subtestaceae, hyalino indistincte et confertissime irroratae ; alae posticae hyalinae.*

"Testaceous, clothed with pale hairs : antennae brown, paler towards the base ; first and second joints and each following joint at the base testaceous : fore-wings slightly testaceous, thickly covered with indistinct colourless dots, some of which are confluent ; veins ferruginous : hind-wings colourless. Length of the body $3\frac{1}{2}$ lines ; of the wings 13 lines.

"*a.* Nova Scotia. From Lieut. Redman's collection."

To this we add :

Head brown above with a few pale bristles and some darker bristles at the posterior margins of the eyes ; face brown with very few pale hairs ; palpi brown ; antennae yellowish brown, the basal joint with yellowish hair, the succeeding joints broadly ringed with black hair ; pronotum brown ; on its anterior angles are warts covered with yellow bristles ; mesonotum brown ; on the anterior part there is on each side of the median line an area of bristles, on the posterior part, a line of three bristles on each side ; tegulae dark brown ; covered with black bristles ; thorax beneath, the legs and their spurs brownish yellow, the coxae with yellow bristles, tibiae and tarsi with black spines, a few black spines also on the femora ; the tibia of the fore leg has a comb of short, black spines along the inner margin ; the spur is long, sharply bent at the tip, set on a prominence that extends beyond the origin of the 1st tarsal joint, the spur of orange colour ; the femur of the fore leg appears to be somewhat grooved, but the groove is not beset with spines ; fore wings granulated, with black hairs restricted almost wholly to the veins and to the marginal fringe ; colour of the wings brownish yellow, darker at the pterostigma and also the posterior margin ; there are numerous indistinct, pale dots which show most plainly along the posterior margin and in the apex of the wing, where they interrupt the colour of the veins.

Length of the fore wing, male, 14 mm.

Genitalia, male.—Apical margin of the 8th tergite bearing two rounded clumps of blackened setae, which scarcely touch each other, so that there is a clear space between them; superior appendages very small and concealed,

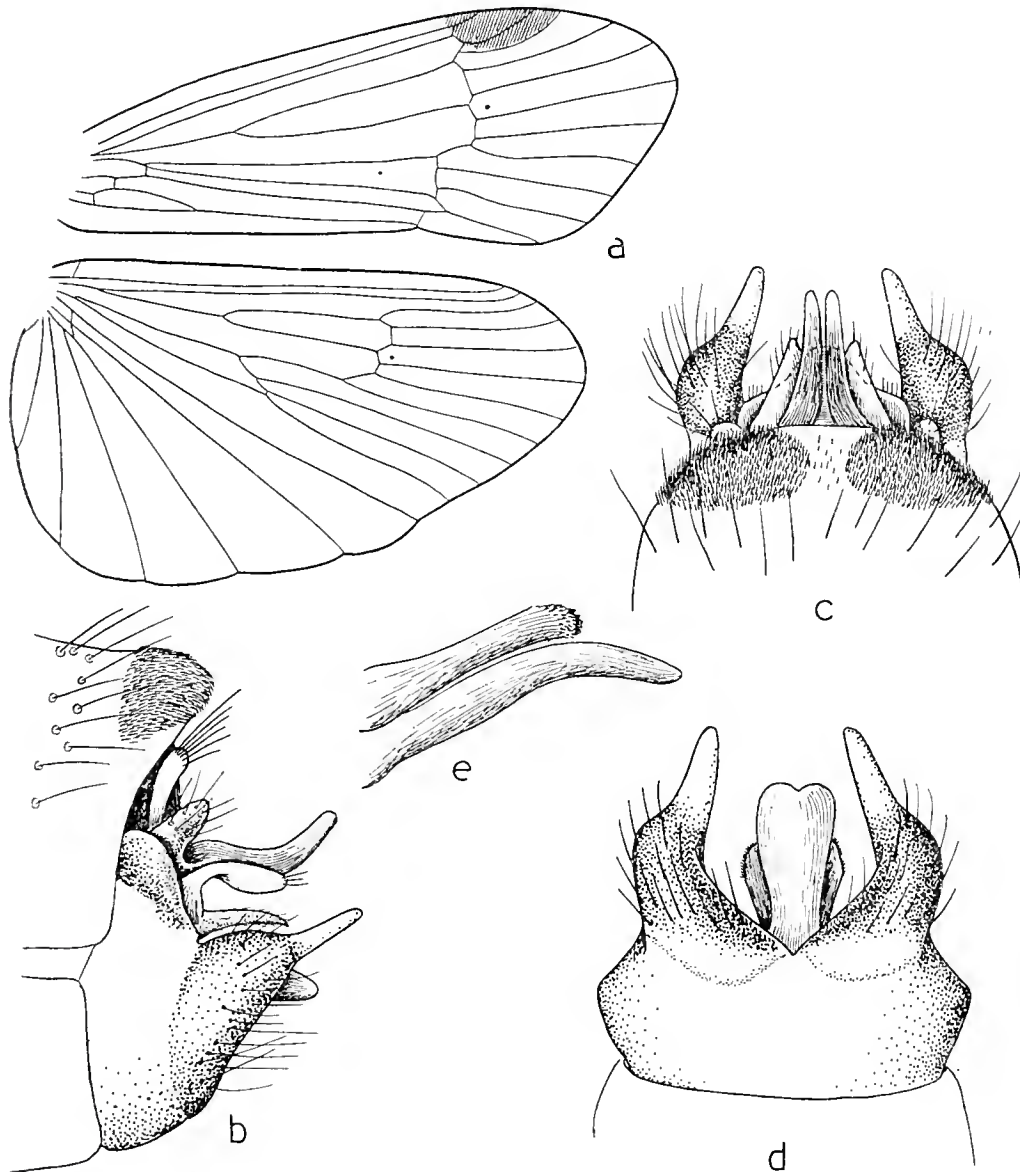


FIG. 83.—*Frenesia difficile* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral; *e*, penis and sheath, lateral.

slender from the side, fringed with unusually stout bristles; intermediate appendages from the side, long, narrow and sinuous, apices upturned, each with a small branch at its base directed upwardly and outwardly; immediately beneath them is an upper penis-cover, from above, broadly triangular, and bearing a pair of conspicuous processes at its base and on its upper surface; penis simple, spatulate, arching downward, apex slightly excised; a pair of

short, straight sheaths with rounded, serrated margins arising from its base ; inferior appendages broad at the bases, narrowing abruptly to finger-like apices directed distally ; the appendages are dilated towards the centre, the dilated portion darkly pigmented ; fused to the 9th tergite ; no ventral teeth.

There is a single male type-specimen.

***Frenesia praeteritum* (Walker).**

(Figs. 84, 85.)

- 1852. *Limnephilus praeteritus* Walker, Cat. Neur. Brit. Mus. : 32.
- 1861. *Enoicyla praeterita* Hagen, Syn. Neur. N. Amer. : 268.
- 1863. *Enoicyla praeterita* McLachlan, Ent. Ann. : 158, 162.
- 1864. *Enoicyla praeterita* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 813.
- 1880. *Chilostigma praeteritum* McLachlan, Rev. and Syn. Trich., Suppl., pt. **2** : xlii, pl. 55, figs. 1-4.
- 1884. *Chilostigma praeteritum* McLachlan, Rev. and Syn. Trich., 1st Add. Suppl. : 15, pl. 1, figs. 1-4.
- 1892. *Ecclisopteryx praeterita* Banks, Trans. Amer. Ent. Soc., **19** : 364.
- 1907. *Chilostigma praeteritum* Ulmer, Genera Insect., fasc. **60a** : 70.
- 1907. *Chilostigma praeterita* Banks, Cat. Neur. Ins. U.S. : 40.
- 1914. *Chilostigma praeteritum* Martynov, Ann. Mus. Zool. Ac. Sci. St. Peters., **19** : 253, figs. 60-62.
- 1919. *Chilostigma praeterita* Banks, Rept. Can. Arct. Exped., **3**, pt. B : 3.
- 1923. *Chilostigma praeterita* Banks, U.S. Dept. Agr., Biol. Surv., N. Amer. Faun., no. **46** : 146.
- 1934. *Chilostigma praeteritum* Betten, N.Y. State Mus. Bull., **292** : 369.
- 1935. *Chilostigma praeteritum* Milne, St. N. Amer. Trich., **2** : 34, 35, 50.

Walker describes the species as follows :

"*Niger ; antennis tibiis tarsisque ferrugineis ; alae anticae fuscae, albido irroratae et maculatae, venis nigris ; alae posticae subhyalinae.*

"Black, clothed with pale hairs : head clothed in front with black hairs : antennae ferruginous ; the 1st joint black : legs ferruginous ; thighs black : fore-wings brown, with numerous minute whitish dots and with some oblong whitish spots in the disk and along the border at the tips : hind-wings almost colourless, with a brown spot on the hind border towards the tip : veins black. Length of the body $3\frac{1}{2}$ lines ; of the wings 11 lines.

"*a.* Arctic Regions. District watered by the Mackenzie and Slave Rivers. Presented by Sir John Richardson."

To this we add :

Head above, except for the warts, black, a few white hairs between the bases of the antennae and just before the ocelli ; both the posterior warts and the warts adjoining the eyes are reddish brown, the hairs of the posterior warts white, of the warts adjoining the eyes, black ; face dark brown to black, with some pale hairs in the middle and some black hairs nearer the eyes ; *antennae* with the basal joint dark brown with pale hair, the 2nd joint small, black, the succeeding joints orange, broadly ringed with short, black hair ; palpi orange ; pronotum black, with two reddish warts bearing pale hair ; mesonotum black ; in its anterior part are two longitudinal brownish areas covered

with pale bristles ; in the posterior part two small similar areas are placed nearer the median line ; *thorax* black beneath ; *legs* with femora black, the

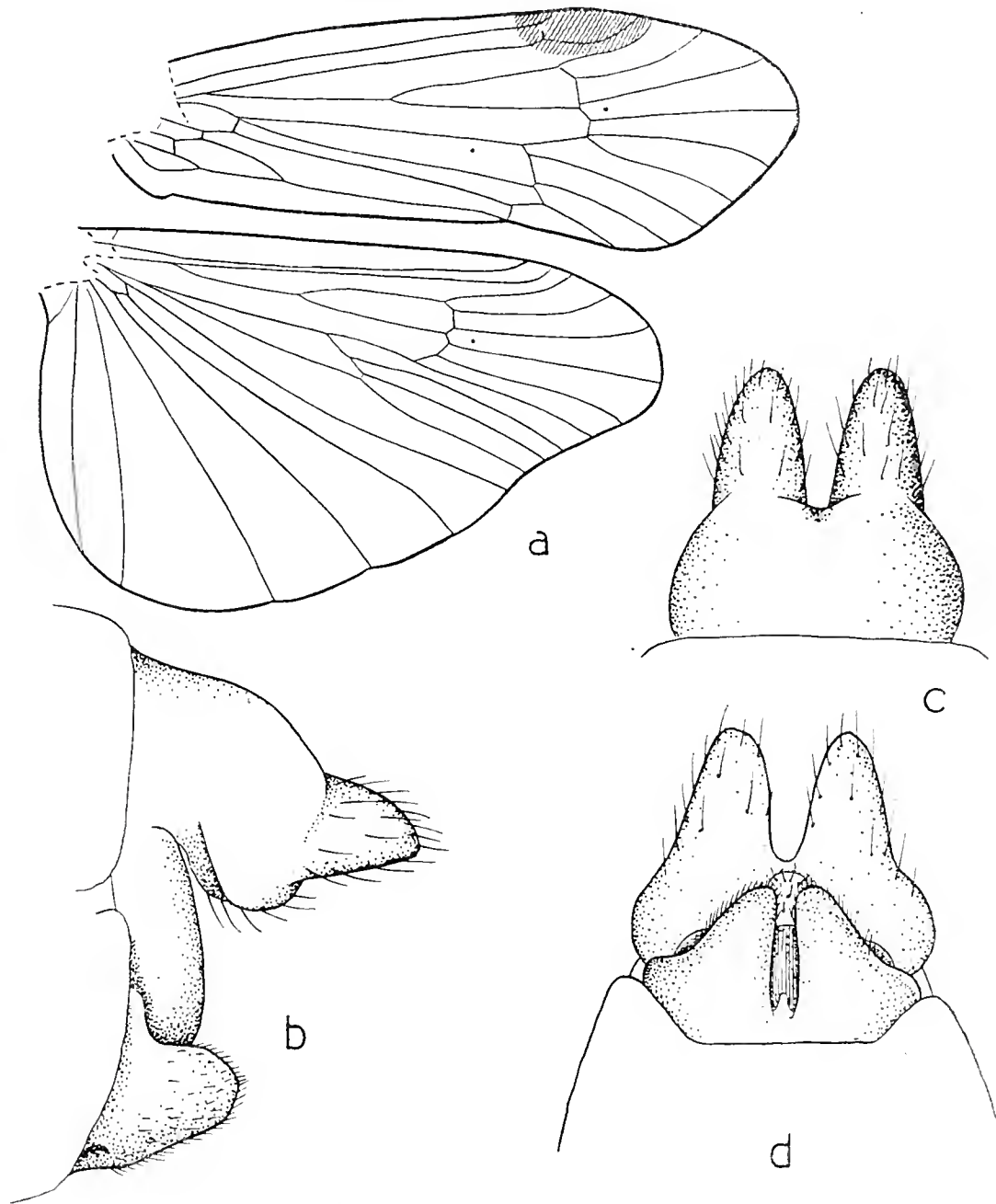


FIG. 84.—*Frenesia praeteritum* Walk. ♀: a, wings ; b, genitalia, lateral, c, dorsal, d, ventral.

tibiae and tarsi orange, the spines black ; *fore wings* with the membrane granulated, covered with black hairs which are longest on the anal veins ; the apical margin indented at the tips of the veins ; colour of the wings in general brown, with very many white dots and larger white areas ; the costal

margin and most of the cell Sc clear; cell R_2 almost wholly clear; white spots on the apical margin in cells R_3 , R_4 , R_5 , M_1 and M_2 ; an angulate white spot in cells R and M in the middle of the wing and white spots also further toward the base of these cells; pterostigma brown in both wings.

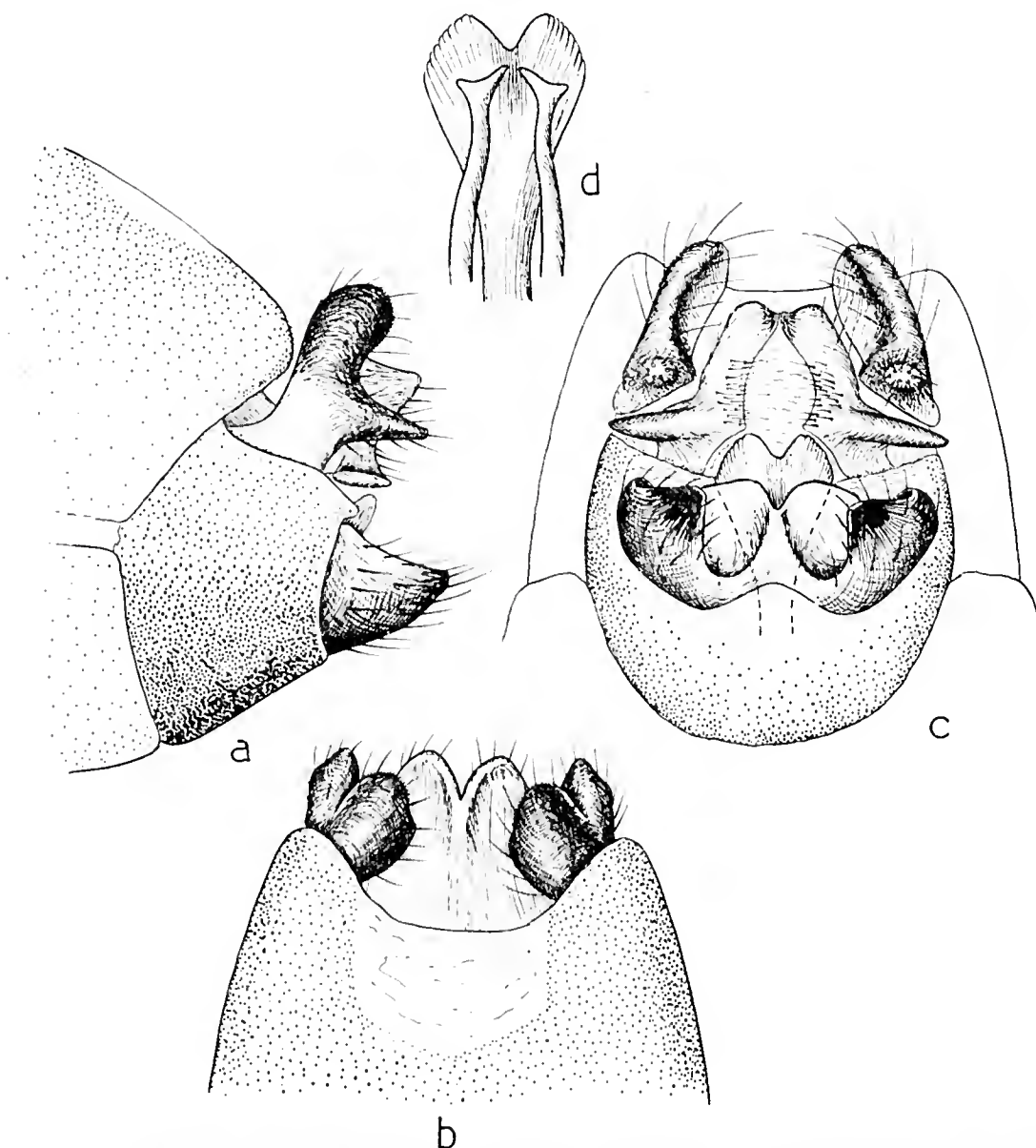


FIG. 85.—*Frenesia praeteritum* Walk. ♂: *a*, genitalia, lateral, *b*, dorsal, inferior appendages and penis omitted, *c*, from behind; *d*, penis and sheaths.

In Walker's description of the hind wing, the phrase "with a brown spot on the hind border towards the tip" should probably read "on the anterior border" and the reference is doubtless to the pterostigma.

Length of the fore wing, female, 12 mm.

Genitalia, male.—The apical margin of the 8th tergite is widely excised; the tergite is pigmented very darkly, and below the excision there is a deep, pentagonal, clear patch, which contrasts strongly with the rest of the segment; from the side, the lateral margin of the tergite is produced in a triangle with a rounded apex; superior appendages branched; from the side, the upper branch is directed upwards, stout, the apex rounded; lower branch shorter, tapering to an acute apex directed distally; between the superior appendages and the apical margin of the 8th tergite is a deep, saucer-like depression; intermediate appendages fused together to make a hood, deeply excised at its apex with lateral wings, straight and pointed which, from the side, may be seen projecting beneath the lower branch of the superior appendage; penis short and membranous, from beneath, apex dilated and striated, with a widely excised apical margin; penis-sheaths long, with dilated apices resembling a pair of upwardly turned boots; inferior appendages large, triangular from the side; from behind, it may be seen that they have inner, concave folds, whose inner margins are welded to each other to form a raised triangle; the apical margin of the 9th sternite is produced in a wide triangle.

Genitalia, female.—The 9th tergite deeply excised at its apical margin to make a pair of rather broad, nearly parallel, stout finger-like processes, triangular from the side, with a small rounded plate at the base of the excision as seen from beneath; a somewhat similar pair of processes arises at the centre of the margin of the 8th sternite, shorter, broader at the base, and with more rounded apices as seen from the side; between the bases of these processes is a small, finger-like lobe; no ventral teeth.

Both the sexes of this species have been described and figured by McLachlan (1880, 1884). The cross-vein between Sc and R₁ referred to in that description is present in the type but is not complete.

The type material consists of a single female specimen. The description of the male genitalia and the figures have been made from a specimen labelled "Arctic America", received in the British Museum in 1855.

Glyphopsyche irrorata (Fabricius).

(Fig. 86.)

- 1781. *Phryganea irrorata* Fabricius, Spec. Insect. : 389.
- 1787. *Phryganea irrorata* Fabricius, Mant. Insect. : 245.
- 1793. *Phryganea irrorata* Fabricius, Ent. Syst. : 77.
- 1852. *Limnophilus intercisa* Walker, Cat. Neur. Brit. Mus. : 30.
- 1861. *Enoicyla intercisa* Hagen, Syn. Neur. N. Amer. : 268.
- 1863. *Enoicyla intercisa* McLachlan, Ent. Ann. : 155, 156, 158, 162 (raises the question of identity with *irrorata*).
- 1864. *Enoicyla intercisa* McLachlan, Trans. Ent. Soc. Lond., (3) 1 : 657 (*intercisa* reduced to synonymy).
- 1864. *Enoicyla irrorata* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 812.
- 1876. *Limnophilus intercisa* McLachlan, Rev. and Syn. Trieh. : 188 (transfer to *Chilcstigma* suggested).

1877. *Ecclisopteryx intercisa* Provancher, Le Nat. Can., 9 : 259.
 1878. *Ecclisopteryx intercisa* Provancher, Petite Faun. Ent. Can., 2 : 134.
 1878. *Chilostigma intercisa* Hagen, N.Y. Com. Fish., 10th Rep., Appen. : 85.
 1892. *Ecclisopteryx irrorata* Banks, Trans. Amer. Ent. Soc., 19 : 364.
 1904. *Glyphopsyche bryanti* Banks, Proc. Ent. Soc. Wash., 6 : 141.
 1906. *Glyphopsyche irrorata* Ulmer, Notes Leyd. Mus., 28 : 7, fig. 7 (*bryanti* reduced to synonymy).
 1907. *Glyphopsyche irrorata* Ulmer, Genera Insect., fasc. 60a : 71, pl. 8, fig. 66.
 1907. *Glyphopsyche irrorata* Banks, Cat. Neur. Ins. U.S. : 38.
 1914. *Glyphopsyche irrorata* Martynov, Ann. Mus. Zool. Acad. Sci., 19 : 263, figs. 76-79.
 1934. *Glyphopsyche irrorata* Betten, nec Fabr., N.Y. State Mus. Bull., 292 : 365, pl. 53, figs. 4-6.
 1935. *Glyphopsyche irroratus* Milne, St. N. Amer. Trich., 2 : 24, 50.
 1938. *Glyphopsyche irroratus* Ross, Psyche, 45 : 31, pl. 6, figs. 53, 53a (type of *bryanti* designated).

Walker describes *Limnephilus intercisa* as follows :

"*Ferrugineus, albo-tomentosus ; caput supra, thorax vittis duabus, et abdomen fusca ; alae anticae fuscae albo-tomentosae, maculis nonnullis albis discalibus et apicalibus ornatae.*

"Ferruginous, covered with white down : disk of the head, two stripes of the thorax and abdomen brown : legs testaceous : fore-wings brown, with white down, here and there with some darker marks, speckled with white, with three white spots in the disk and with a smaller one on the tip of each of the apical and subapical areolets ; two of the discal spots are on the cell of the thyridium, and one on the 4th and 5th apical areolets ; tips slightly notched : hind-wings slightly gray. Length of the body 4-4½ lines ; of the wings 15-16 lines.

"Var. β. *Niger ; antennis pedibusque ferrugineis ; thorax cano vittatus ; alae anticae fuscae, albido irroratae, maculis fuscis obscurioribus albidisque discalibus et apicalibus ; alae posticae subcinereae.*

"Black, clothed with pale hairs, tinged with gray : antennae, legs, and tip of the abdomen ferruginous : thorax with a very broad hoary stripe : fore-wings brown, very minutely tuberculated, covered with white, sprinkled with whitish dots, adorned with some oblong darker brown and whitish spots on the disk, and with small white spots along the tips : hind-wings slightly gray. Length of the body 5 lines ; of the wings 15 lines.

"*a-e.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

To this we add :

Head black above with white hairs in front between the antennae ; a small group of white hairs just behind each ocellus ; posterior warts brown, covered with white hair ; the warts adjoining the eyes posteriorly are black and are covered with black hair ; face dark brown with black hair mostly near the eyes ; *antennae* with the first two joints dark brown with white hair, the remaining joints yellowish brown, with short black hair, lighter in colour as seen from beneath ; pronotum black, the warts brown and covered with white and some black bristles ; mesonotum black with a row of black bristles on either side of the median line ; the bristles are in broad white stripes which run lengthwise over the mesonotum ; tegulae black with black bristles ; *legs* brown, the fore legs darkest, the coxae with yellow bristles, the tibiae and tarsi with black spines ; spurs 1, 2, 2 ; not much longer than the spines, hardly distinguishable by colour, but yellowish at their tips ; *fore wings* strongly excavated

along the post-apical margin, covered with very short, white pubescence and with longer black hairs, the latter on the veins, particularly on the conjoined anal vein; the general colour of the wings is brown with very many white dots over the entire surface; there are several larger white spots, two in cell M, one each in the bases of cells R_4 , R_5 , M_1 and M_2 , and one at the wing margin in each of the apical cells; the stigma is well marked in both *fore* and *hind* wings; *abdomen* brown with a lateral pale stripe.

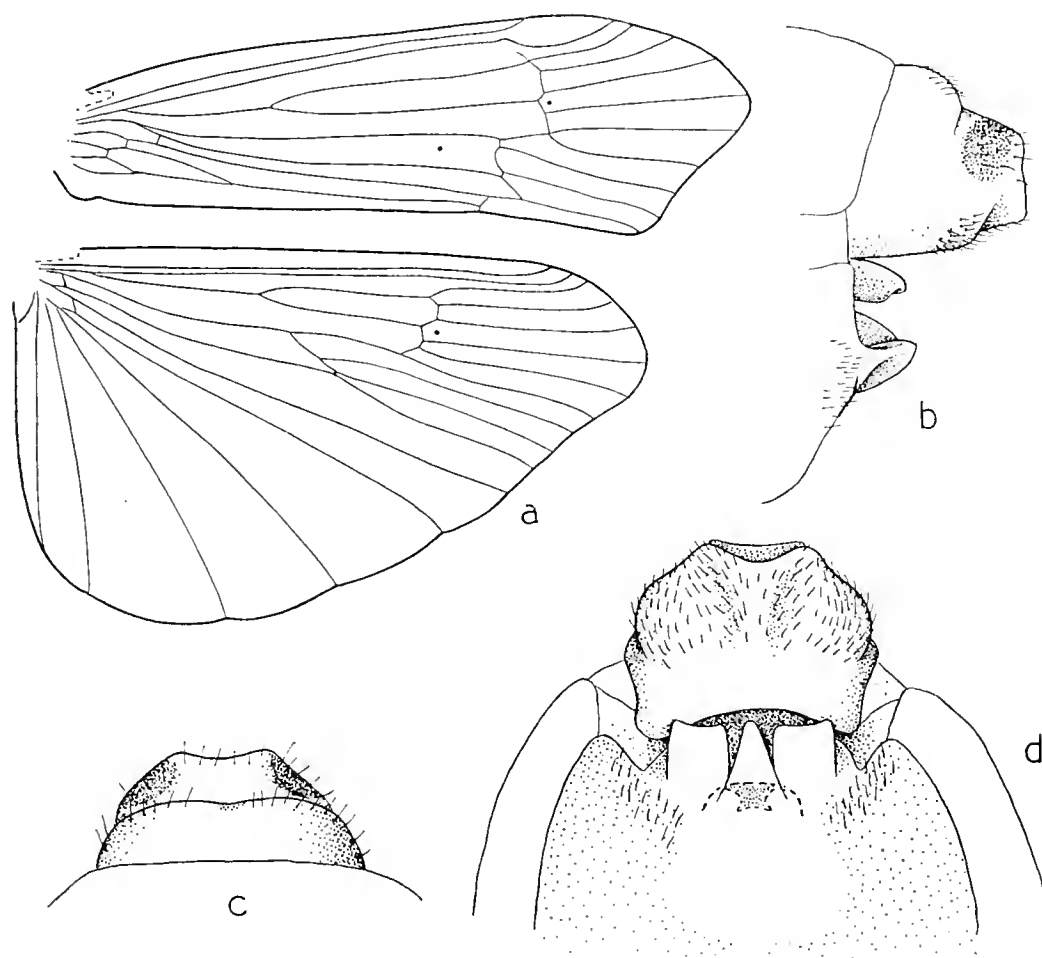


FIG. 86.—*Glyphopsyche irrorata* Walk. ♀: a, wings; b, genitalia, lateral, c, dorsal, d, ventral.

Length of the fore wing, female, 15 mm.

Genitalia, female.—The apex of the abdomen from above terminates in a blunt, tubular piece with a widely truncate and slightly excised apical margin and with a pair of rounded, lateral, pigmented areas overlapping onto the dorsal side; from beneath, the ventral margin of the tubular piece is excised; vulvar scale with a somewhat slender central lobe; side-lobes about twice its width, apical margins truncate or slightly sinuous, all of about the same length; from the side, there is a projecting shelf above the vulvar scale, visible from beneath in a balsam preparation as a rounded plate; no ventral teeth.

We designate as the type of Walker's *Limnephilus intercisis* the specimen so labelled, the abdomen being now mounted in balsam in the Museum collection.

We follow the course taken by the authors of most of the more recent references to *Glyphopsyche irrorata* Fabr. of considering that McLachlan (1876 : 188), in referring to *Limnophilus intercisis* Walker, did not mean to reinstate Walker's species, which he himself had previously (1864 : 657) reduced to synonymy.

The five female specimens show some variation in the distribution of the white spots on the wings and in the amount of white on the mesonotum ; in some of them the white colour is found not only on the mesonotum but also to some extent on the head.

It is not possible to determine which specimen or specimens were set apart by Walker as var. β .

***Apatania nigra* (Walker).**

(Figs. 87, 88.)

Phryganea nigra Barnston MSS.

- 1852. *Potamaria nigra* Walker, Cat. Neur. Brit. Mus. : 83.
- 1861. *Apatania nigra* Hagen, Syn. Neur. N. Amer. : 270.
- 1863. *Apatania nigra* McLachlan, Ent. Ann. : 158, 162.
- 1864. *Apatania nigra* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 805.
- 1892. *Apatania nigra* Banks, Trans. Amer. Ent. Soc., 19 : 364.
- 1907. *Apatania nigra* Ulmer, Genera Insect., fasc. 60a : 76.
- 1907. *Apatania nigra* Banks, Cat. Neur. Ins. U.S. : 40.
- 1934. *Apatania nigra* Betten, N.Y. State Mus. Bull., 292 : 379.
- 1935. *Apatelia nigra* Milne, St. N. Amer. Trich., 2 : 25, 49.
- 1938. *Apatelia nigra* Ross, Psyche, 45 : 28.

Walker describes the species as follows :

"*Nigra, nigro-pilosa ; abdominis segmentis apice tarsis basi tibiisque ferrugineis ; alae nigricantes.*

"Black, clothed with black hairs above, with some tawny hairs beneath : antennae rather short, much longer than the body : breast tinged with gray : hind borders of abdominal segments, tarsi at the base and tibiae ferruginous : wings blackish with black hairs. Length of the body $2\frac{1}{4}$ lines ; of the wings $7\frac{1}{2}$ lines.

"*a.* St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq."

To this we add :

Head black above with black hairs ; face black, with pale hair ; *antennae* dark brown ; palpi black with very short pale hair ; *thorax* black above and beneath, the pronotum with tawny bristles ; coxae black with white bristles ; femora black, tibiae and tarsi paler with yellow spurs and black spines ; *fore wings* brown, with a covering of black hairs mostly on R_1 and Cu_1 and with a black fringe, the membrane finely granulated, the pterostigma more coarsely granulated and more densely covered with hairs than the rest of the wing.

Length of the fore wing, male, 7 mm.

Genitalia, male.—In the type of the species, the genitalia are much damaged

and most parts are more or less wanting. There is a second male example, from the Barnston collection, not mentioned in Walker's Catalogue, also damaged, but less so than is the type. The description of the genitalia here given is composite, having been made from both examples.

Apical margin of the 9th tergite produced at its centre in a spindle-shaped process, somewhat furrowed on its upper surface. In the type, the apex is subacute, but in the second example, slightly excised; in contrast with the

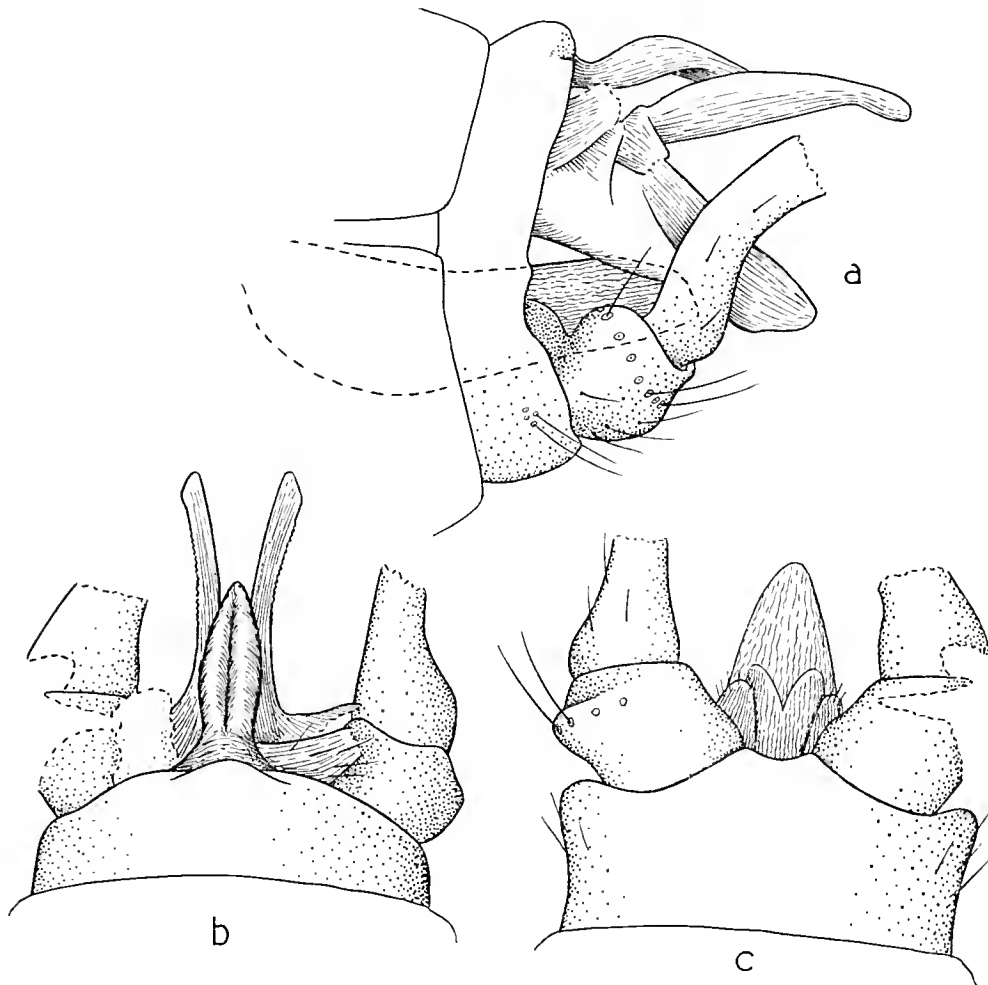


FIG. 87.—*Apatania nigra* Walk. ♂ (type): *a*, genitalia, lateral, *b*, dorsal, *c*, ventral.

ordinary pattern of the genus there are two small superior appendages, margins coarsely serrate; intermediate appendages (?) long and trifurcate; from above, inner forks narrow, parallel-sided, apices obliquely truncate and divergent; outer forks separated from the inner by wide, rounded excisions, also long, slender, both forks slightly down-curved as seen from the side; from this aspect the third fork is seen to arise at the base of the appendage, with a slender stem and dilated apical part, outer margin serrate; both the 2nd and 3rd forks are wanting in the type; penis straight and inconspicuous, with a membranous, conical upper penis-cover and a dilated and excised apex; from

beneath may be seen two small, fringed processes one on each side of the apex, possibly pertaining to a lower penis-cover; inferior appendages, all broken in both specimens, two-jointed; basal joint short, bulbose, terminal joint long and slender.

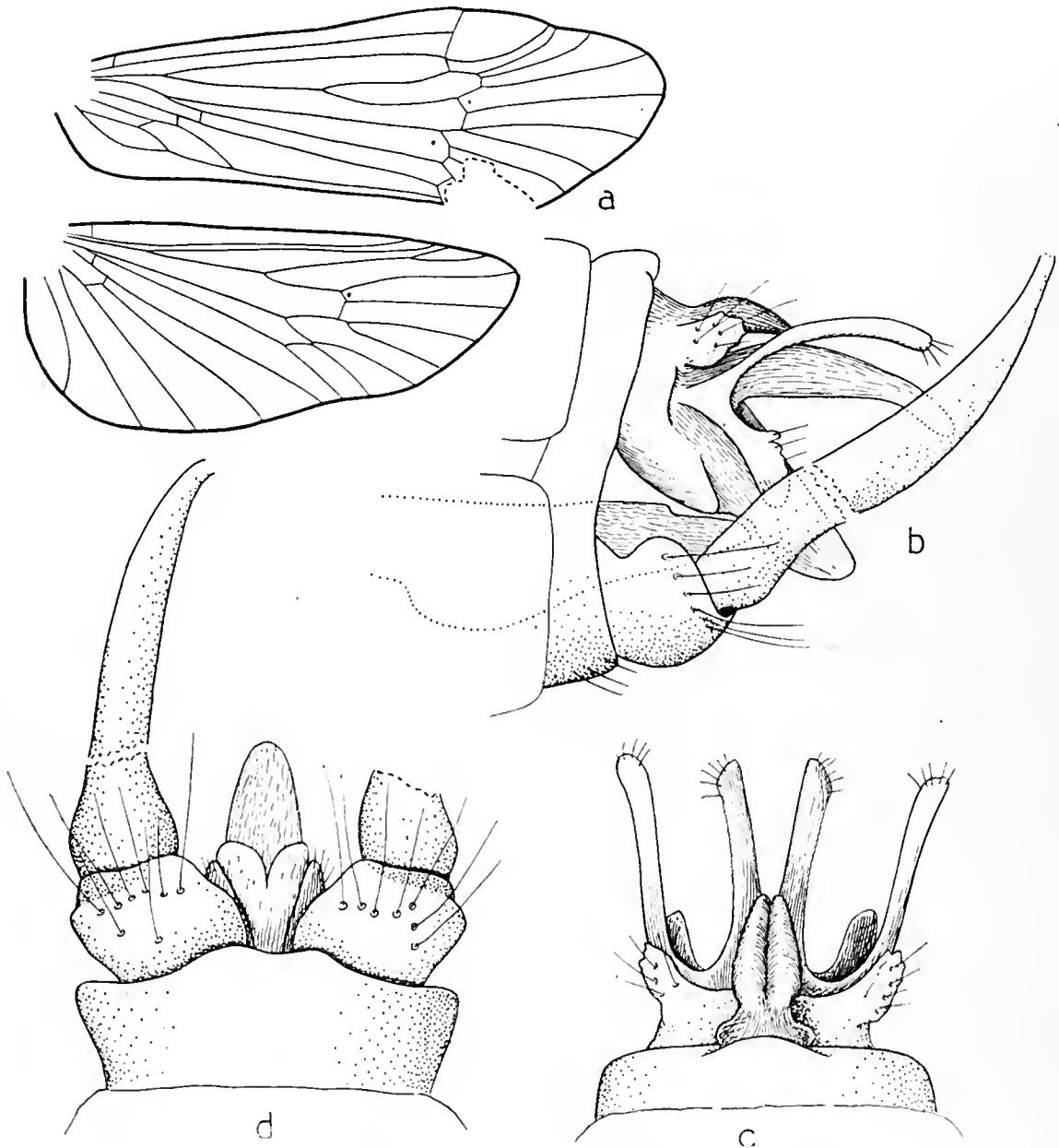


FIG. 88.—*Apatania nigra* Walk. ♂ (from a second example): *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

One terminal joint, fractured and incomplete, was present in the second specimen, but the fractured part became completely detached during description. The apex of this joint is wanting.

We take as the type of the species the male specimen bearing Barnston's label "*Phryganea nigra*".

SERICOSTOMATIDAE.

Brachycentrus fuliginosus Walker.

(Fig. 89.)

Phryganca fuliginosa Barnston MSS.

1852. *Brachycentrus fuliginosus* Walker, Cat. Neur. Brit. Mus. : 88.
 1861. *Brachycentrus fuliginosus* Hagen, Syn. Neur. N. Amer. : 272.
 1861. *Brachycentrus incannus* Hagen, Syn. Neur. N. Amer. : 272.
 1863. *Brachycentrus fuliginosus* McLachlan, Ent. Ann. : 162.
 1864. *Brachycentrus fuliginosus* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 807.
 1864. *Brachycentrus incannus* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 807.
 1864. *Brachycentrus fuliginosus* McLachlan, Trans. Ent. Soc. Lond., (3) 1 : 658 (quotes Hagen's opinion that *incannus* is a synonym).
 1877. *Brachycentrus fuliginosus* Provancher, Le Nat. Can., 9 : 261.
 1878. *Brachycentrus fuliginosus* Provancher, Petite Faun. Ent. Can., 2 : 137.
 1892. *Brachycentrus fuliginosus* Banks, Trans. Amer. Ent. Soc., 19 : 365 (*incannus* listed as synonym).
 1907. *Brachycentrus fuliginosus* Ulmer, Genera Insect., fasc. 60a : 91.
 1907. *Brachycentrus fuliginosus* Banks, Cat. Neur. Ins. U.S. : 42.
 1934. *Brachycentrus fuliginosus* Betten, N.Y. State Mus. Bull., 292 : 384, pl. 57, figs. 4-9; pl. 58, figs. 1, 2.
 1936. *Brachycentrus fuliginosus* Milne, St. N. Amer. Trich., 3 : 113, 123.
 1938. *Brachycentrus incannus* Ross, Psyche, 45 : 42 (type-specimen of *incannus* designated).

Walker describes the species as follows :

"*Niger ; cano-hirtus, abdominis segmentis apice pedibusque testaceis ; antennae ferrugineae ; palpi testacei, apice nigricantes ; alae anticae fusco-cinereae, posticae cinereae.*

"Black, tinged with gray, clothed with hoary hairs : antennae ferruginous, longer than the body : palpi testaceous, with blackish tips : hind borders of the abdominal segments and legs testaceous : fore-wings brownish-gray, with pale down ; veins ferruginous : hind-wings gray. Length of the body 4 lines ; of the wings 12 lines.

"*a. St. Martin's Falls, Albany River, Hudson's Bay. Presented by G. Barnston, Esq.*"

To this we add :

Head black above, a wart with white hair behind each antenna near the median line ; white hairs also on the posterior warts ; face black with white hair mostly near the eyes ; a few black hairs at the eye margins ; *antennae* with basal joint dark brown, the succeeding joints yellowish, narrowly ringed with brown ; palpi yellow ; *thorax* black above, dark brown beneath ; the mesonotum with a small area of white bristles anteriorly near the median line ; tegulae black, covered with white bristles ; 1st and 3rd pairs of *legs* (2nd pair missing) yellow, the coxae black with pale bristles ; *fore wings* brown, the veins a darker brown ; there is a scant covering of very short, pale hair, and at the anal angle there are long, white hairs in the fringe.

Length of the fore wing, female, 13 mm.

Genitalia, female.—The 9th tergite with the apical margin slightly produced and acute ; beyond it is a large plate or hood, the apex triangularly excised ;

from the side there is a rounded projection immediately beneath the hood ; from beneath, the terminal segment is deeply and widely excised ; the margin of the penultimate segment is slightly excised at its centre, apical angles produced in large, ear-like lobes ; internal structures of the vagina narrow.

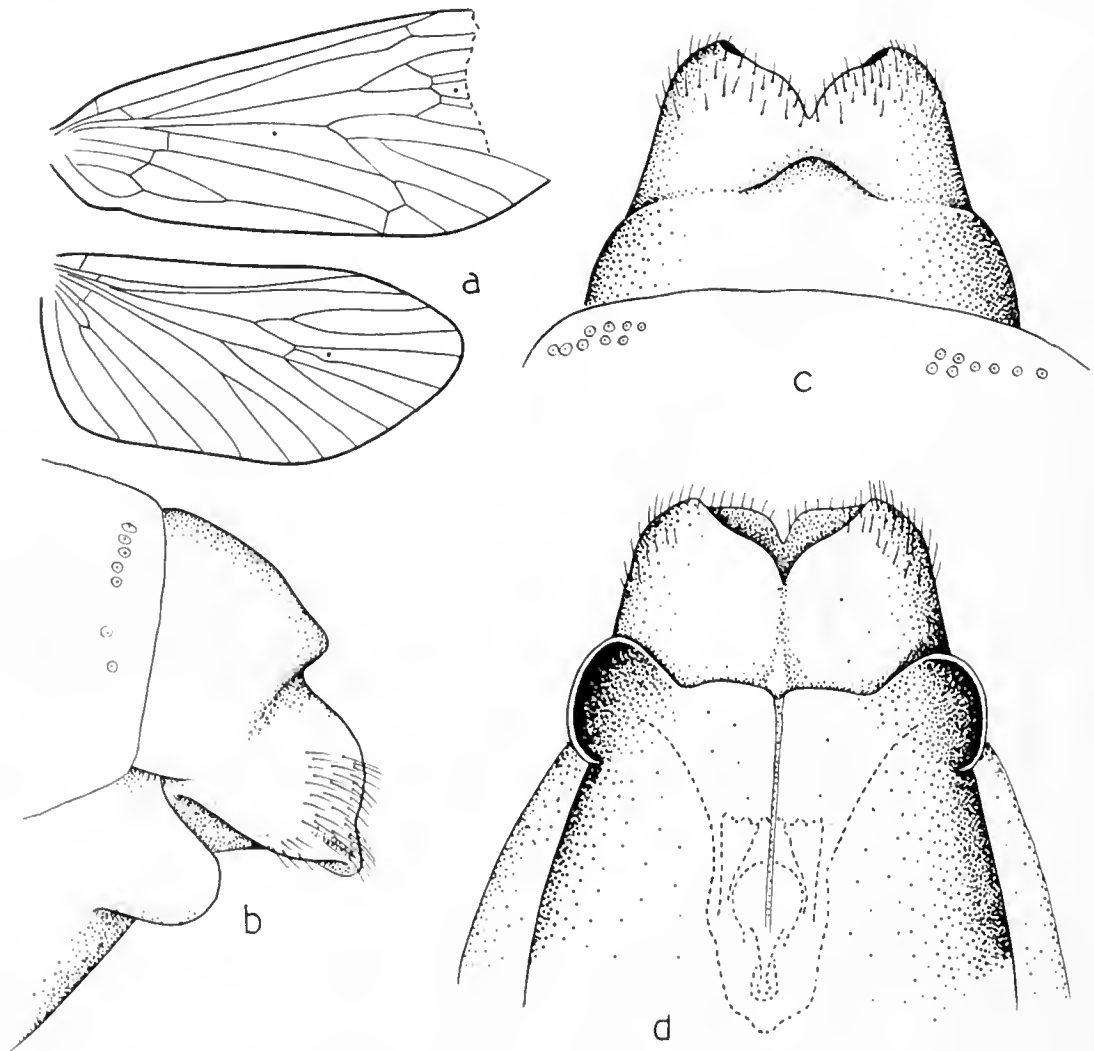


FIG. 89.—*Brachycentrus fuliginosus* Walk. ♀: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

The type material is Walker's single female specimen, here re-described.

As indicated by Milne (*l.c.*) and Ross (*l.c.*), the separation of this species from *B. numerosus* Say and *B. lateralis* Say is uncertain.

***Notidobia crassicornis* (Walker).**

(Figs. 90, 91.)

- 1852. *Hydropsyche crassicornis* Walker, Cat. Neur. Brit. Mus. : 113.
- 1861. *Sericostoma crassicorne* Hagen, Syn. Neur. N. Amer. : 271.
- 1863. *Sericostoma crassicorne* McLachlan, Ent. Ann. : 162.

1864. *Sericostoma crassicorne* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 880.
 1876. *Notidobia crassicornis* McLachlan, Rev. and Syn. Trich. : 225.
 1892. *Sericostoma crassicorne* Banks, Trans. Amer. Ent. Soc., **19** : 364.
 1907. *Notidobia crassicornis* Ulmer, Genera Insect., fasc. **60a** : 85.
 1907. *Sericostoma crassicorne* Banks, Cat. Neur. Ins. U.S. : 41.
 1934. *Agarodes crassicornis* Betten, N.Y. State Mus. Bull., **292** : 391-392.
 1936. *Notidobia crassicornis* Milne, St. N. Amer. Trich., **3** : 114-115, 124.

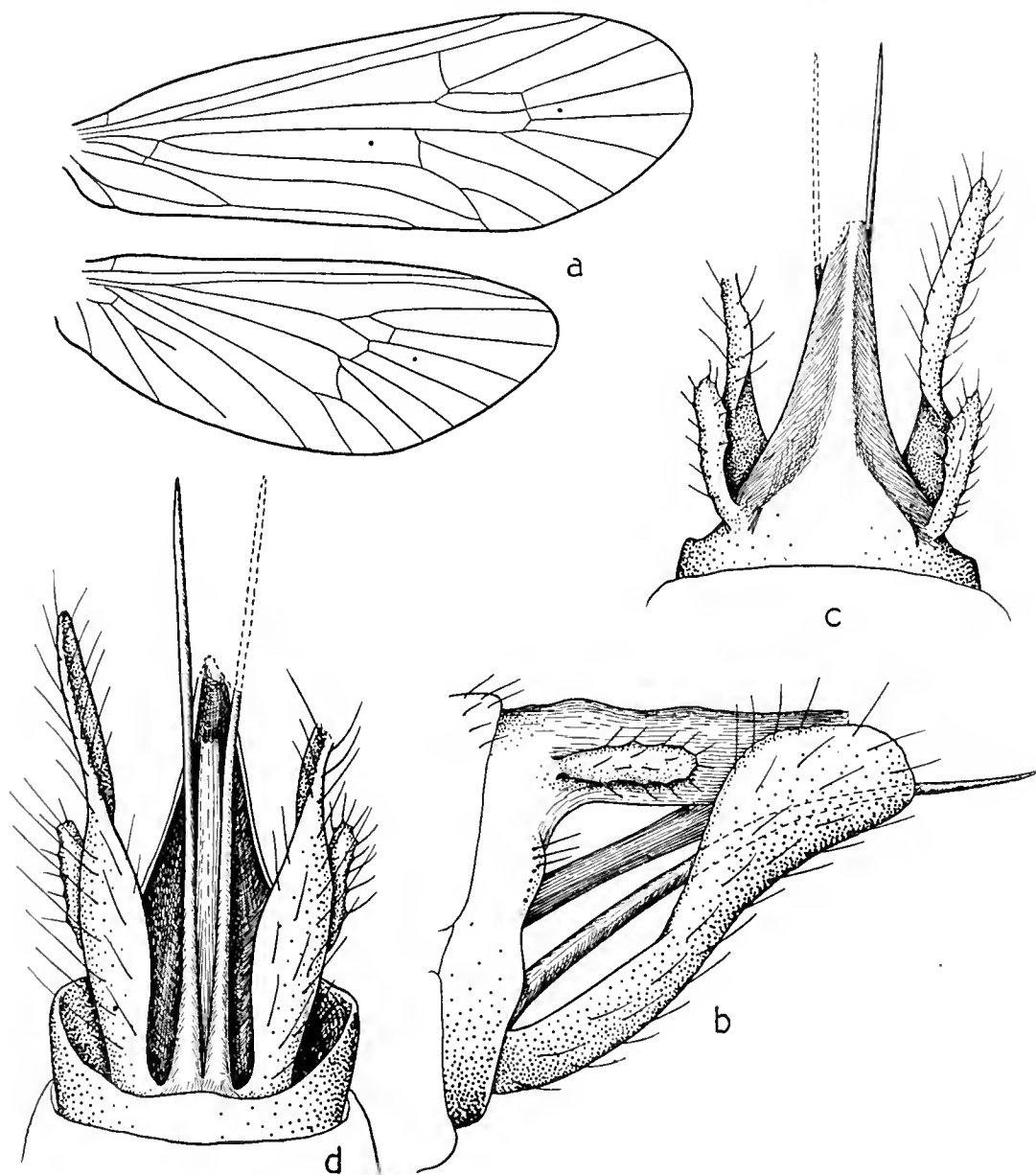


FIG. 90.—*Notidobia crassicornis* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

Walker describes the species as follows :

“*Ferruginea, fulvo-hirta; antennae articulis basi pallidioribus; palpi pedesque testacei; alae cinereae fulvo-pilosae, anticae macula discali subhyalina.*”

“ Ferruginous, clothed with tawny hairs : antennae very stout, very much longer than the body ; each joint paler towards the base : palpi and legs testaceous : wings gray, clothed with tawny hairs ; fore-wings with an almost colourless spot at the base of the apical areolets ; veins brown. Length of the body $2\frac{1}{2}$ lines ; of the wings 9 lines.

a, b, Georgia. From Mr. Abbot's collection.

To this we add :

Head above, male, dark brown, covered to a considerable extent by the basal joints of the antennae ; the warts extend longitudinally along the eye

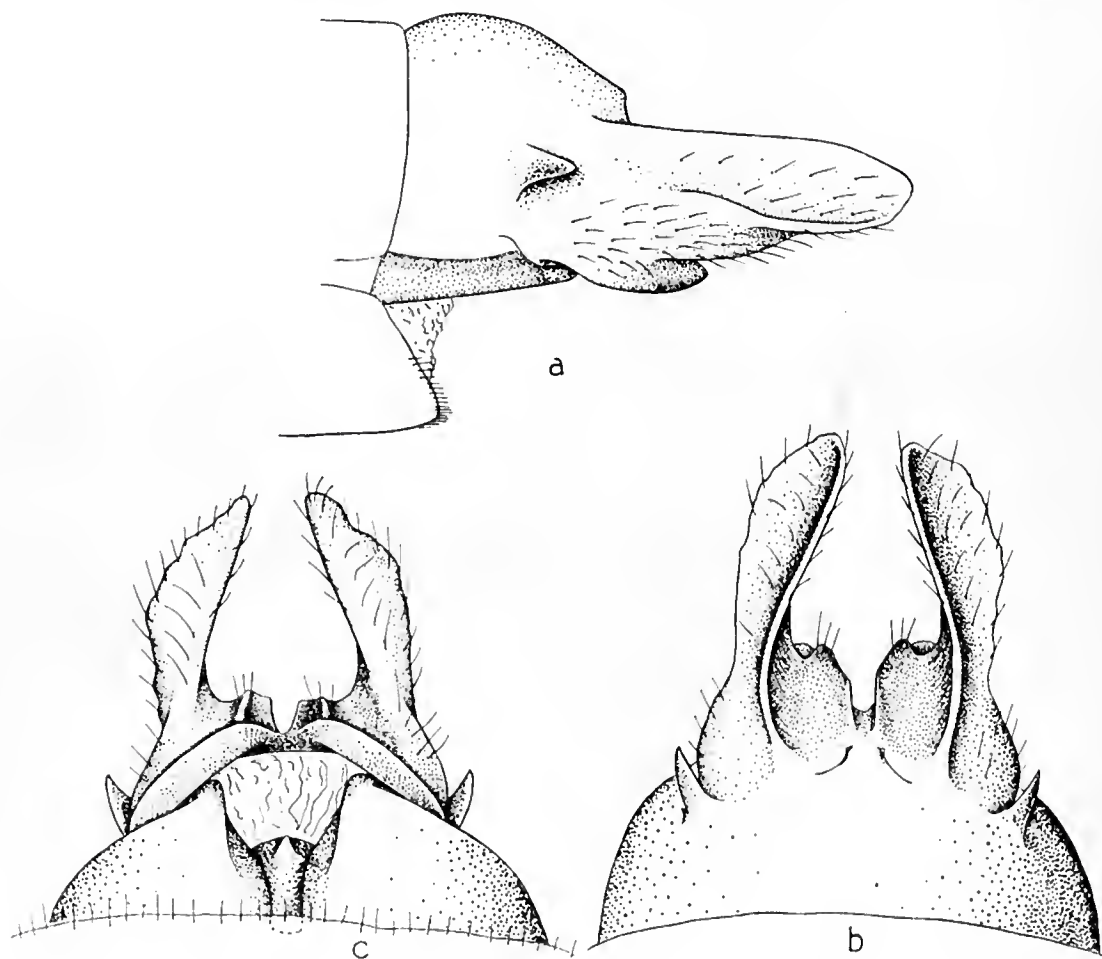


FIG. 91.—*Notidobia crassicornis* Walk. ♀ : *a*, genitalia, lateral, *b*, dorsal, *c*, ventral.

margins and are narrowed both before and behind, covered with tawny bristles ; another pair of warts posterior to the eyes are covered with black bristles ; basal joints of the *antennae* very large, extended posteriorly to the middle of the head and pressed against each other medially ; 2nd joint covered with black hair, the succeeding joints missing ; maxillary palpi large, covering the face ; labial palpi extending out further than the maxillary ; pronotum not well shown, yellowish and covered with bristles ; metanotum yellow ; fore

legs dark brown; middle and hind legs with the femora brown, tibiae and tarsi yellow with yellow hair and black spines; spurs 2, 2, 4; *fore wings* brown with some short, tawny hair, most conspicuous on Cu_1 before its branching, and in the region of the discal cell; the anterior margin and the pterostigma darker brown.

In the female, the antennae and palpi are not modified as in the male.

Length of the fore wing, male, 8 mm.; female, 9 mm.

Genitalia, male.—The genitalia of the type are slightly damaged and small portions are wanting. The apical margin of the 9th tergite is produced in a long, slender, hood-like dorsal plate, of which the apex is wanting in the type; on each side of this plate are rather short, slender superior appendages constricted at their bases; penis straight and slender, apical portion wanting; inferior appendages furcate, outer branches long with dilated apices, inner branches spiniform and still longer, both branches of one appendage partly wanting.

Genitalia, female.—Terminal dorsal segment excised at its apex, the sides of the excision produced in large lobes with dilated apices; at the bases of these lobes, on their inner sides, are wide shelves with small triangular projections of their inner apical angles, and there is another pair of small, narrow, spur-like processes on the upper surface of the segment towards the lateral margins of the lobes near their bases; from beneath there is a vulvar scale (?) with a small central lobe and wide, indefinite side-lobes (?).

We designate the male specimen as the type of the species, the female as the allotype.

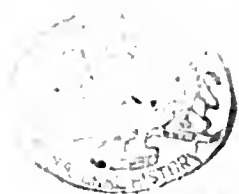
In the development of the basal joint of the antenna, this species is intermediate between *Notidobia grisea* Banks and *N. distincta* Ulmer.

Species names. (The leading names throughout are Walker's.)	Walker's generic designation.	Present generic placement.	Habitat of specimens listed by Walker.											Total.	Number of Walker specimens now in the collection.		
			Hudson's Bay.	Georgia.	Nova Scotia.	N. America.	Ariz. America.	Great Bear L.	Newfoundland.	U.S.	N.Y. State.	St. Lawr. R.	E. Florida.			St. Domingo.	Haiti.	Unknown.
<i>fuscata</i> .	<i>Neuronia</i>	<i>Rhyacophila</i>	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1
<i>invarius</i> .	<i>Polycentropus</i>	"	..	..	1	..	..	..	..	..	..	..	..	..	..	1	1
<i>obscura</i> (partim) = <i>walkeri</i>	<i>Berea</i> ?	<i>Synagapetus</i>	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1
<i>tenebrosa</i> .	<i>Hydroptila</i>	<i>Protophila</i>	5	..	..	..	..	..	..	..	..	..	..	..	..	5	4
<i>distinctus</i> .	<i>Philopotamus</i>	<i>Trentonius</i>	..	..	..	..	..	..	..	4	..	..	..	..	..	4	2
<i>bracconoides</i> .	<i>Curgia</i>	<i>Chimarraha</i>	..	..	..	..	..	..	..	..	..	..	1	..	..	1	1
<i>obscura</i> (partim) = <i>obscura</i>	<i>Berea</i> ?	"	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1
<i>alternans</i> .	<i>Philopotamus</i>	<i>Hydropsyche</i>	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1
<i>indecisus</i> .	"	"	1	..	1	..	..	..	..	..	..	..	..	..	..	2	2
= <i>alternans</i>																	
<i>confusus</i> .	"	"	..	..	..	..	1	..	..	..	..	..	..	..	..	1	1
<i>dubia</i> .	<i>Hydropsyche</i>	"	..	..	..	1 ?	..	..	..	..	..	..	..	..	..	..	1
<i>reciprocus</i> .	<i>Philopotamus</i>	"	..	..	..	1 ?	..	..	..	..	..	..	..	..	..	..	1
<i>maculicornis</i> .	<i>Hydropsyche</i>	"	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1
= <i>walkeri</i>			1	..	..	..	..	..	..	..	..	..	..	..	..	1	1
<i>robusta</i> .	"	<i>Cheumatopsyche</i>	..	..	..	2 ?	..	..	..	..	..	..	..	..	..	2	0
<i>transversa</i> .	"	<i>Macronema</i>	..	2	..	..	..	..	..	..	..	..	..	..	..	2	2
<i>crepuscularis</i> .	<i>Brachycentrus</i>	<i>Neureclipsis</i>	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1
<i>crassicornis</i> (partim) = <i>parvula</i>	<i>Polycentropus</i>	"	..	1	..	..	..	..	..	..	..	..	..	..	..	1	1
<i>validus</i> .	"	"	..	..	..	..	..	1	..	..	..	..	..	..	..	1	1
<i>dubitans</i> .	<i>Hydropsyche</i>	"	..	..	..	..	..	1	..	..	..	..	..	..	..	1	1
= <i>validus</i>																	
<i>crassicornis</i> (partim) = <i>placidus</i>	<i>Polycentropus</i>	<i>Phyllocentropus</i>	..	1	..	..	..	..	..	..	..	..	..	..	..	1	1
<i>crassicornis</i> (partim)	"	<i>Plectrocnemia</i>	..	3	..	..	..	..	..	..	..	..	..	..	..	3	1
<i>parva</i> .	<i>Hydroptila</i> ?	<i>Tinodes</i> ?	1	..	..	..	..	..	..	..	..	..	..	..	..	1	0
<i>latifascia</i>	<i>Notidobia</i>	<i>Anisocentropus</i>	..	..	1 ?	..	..	..	..	..	..	..	..	..	..	1	1
<i>elegans</i> .	<i>Goera</i>	"	..	..	1 ?	..	..	..	..	..	..	..	..	..	..	1	1
= <i>latifascia</i>																	
<i>pyraloides</i> .	<i>Notidobia</i>	"	..	2	..	..	..	..	..	..	..	..	..	..	..	2	1
<i>americanum</i> .	<i>Sericostoma</i>	<i>Ganonema</i>	..	2	..	..	..	..	..	..	..	..	..	..	..	2	2
<i>indecisa</i>	<i>Goera</i>	<i>Psilotreta</i>	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1
<i>inconspicuus</i> (partim) = <i>triphena</i>	<i>Leptocerus</i>	<i>Molanna</i>	..	1	..	..	..	..	..	..	..	..	..	..	..	1	1
<i>mentiens</i>	"	<i>Leptocerus</i>	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1
<i>resurgens</i>	"	"	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1

Specific names. (The leading names throughout are Walker's.)	Walker's generic designation.	Present generic placement.	Habitat of specimens listed by Walker.											Number of Walker specimens now in the collection.				
			Hudson's Bay.	Georgia.	Nova Scotia.	N. America.	Arct. America.	Great Bear L.	Newfoundland.	U.S.	N.Y. State.	St. Lawr. R.	E. Florida.	St. Domingo.	Haiti.	Unknown.	Total.	♂
<i>plaga</i>	<i>Limnephilus</i>	<i>Limnephilus</i>	1	..	1	..	1	..	..	..	..	..	..	..	..	1	..	1
<i>stipatus</i> = <i>nebulosus</i>	"	"	1	..	..	1	..	..	..	..	..	..	..	..	..	2	..	2
<i>perforatus</i> b. = <i>nebulosus</i>	"	"	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	1
<i>paritius</i>	"	"	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..
<i>indivisus</i>	"	"	1	..	1	..	..	..	..	..	..	..	..	..	..	1	1	..
<i>subguttatus</i>	"	"	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..
= <i>indivisus</i>	"	"	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>combinatus</i>	"	"	..	..	..	..	..	..	1	..	..	..	..	..	..	1	1	..
= <i>rhombicus</i>	"	"	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>extractus</i>	"	"	1	..	..	1	..	..	..	..	..	..	..	..	..	1	1	..
<i>submonilifer</i>	"	"	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
<i>perpusillus</i>	"	"	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..
<i>bimaculatus</i>	"	"	1	..	..	..	..	..	..	..	..	..	..	..	..	2	1	2
<i>antica</i>	<i>Neuronia</i>	"	..	2	..	1	..	..	..	..	..	..	..	..	..	1	1	..
<i>divergens (partim)</i>	<i>Limnephilus</i>	"	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	1
= <i>divergens</i>	"	"	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
<i>divergens (partim)</i>	"	"	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
= <i>perplexa</i> sp. n.	"	"	3	..	..	..	..	..	..	..	..	..	..	..	..	3	1	2
<i>gutifer (partim)</i>	<i>Halesus</i>	"	1	1	..	..	..	..	..	..	..	..	..	..	..	2	1	1
<i>gutifer (partim)</i>	"	"	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	1
= <i>lepidus</i>	"	"	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>gutifer (partim)</i>	"	"	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
= <i>subfasciatus?</i>	"	"	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>indicans</i>	<i>Limnephilus</i>	"	..	2	..	..	..	..	..	..	..	..	..	..	..	2	2	2
<i>indistinctus</i>	"	"	..	..	..	1	..	..	..	..	..	..	..	..	..	1	1	..
<i>designatus</i>	"	"	2	..	..	..	2	..	..	..	..	..	..	..	..	2	..	..
			..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1
		
<i>areolatus</i>	"	"	1	..	1	..	..	..	..	..	..	..	..	..	..	1	1	0
<i>difficilis</i>	"	"	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1?
<i>praeteritus</i>	"	"	..	..	..	1	..	..	..	..	..	..	..	..	..	1	1	..
<i>intercisus</i>	"	"	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
= <i>irrorata</i>	"	"	..	..	..	..	..	..	..	..	..	..	..	..	..	5	1	5
<i>nigra</i>	<i>Potamaria</i>	"	1	..	1	..	..	..	..	..	..	..	..	..	..	1	1	..
<i>fuliginosus</i>	<i>Brachycentrus</i>	"	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1
<i>crassicornis</i>	<i>Hydropsyche</i>	"	..	2	..	..	..	..	..	..	..	..	..	..	..	2	1	1

PART II

SPECIES OTHER THAN NORTH
AMERICAN

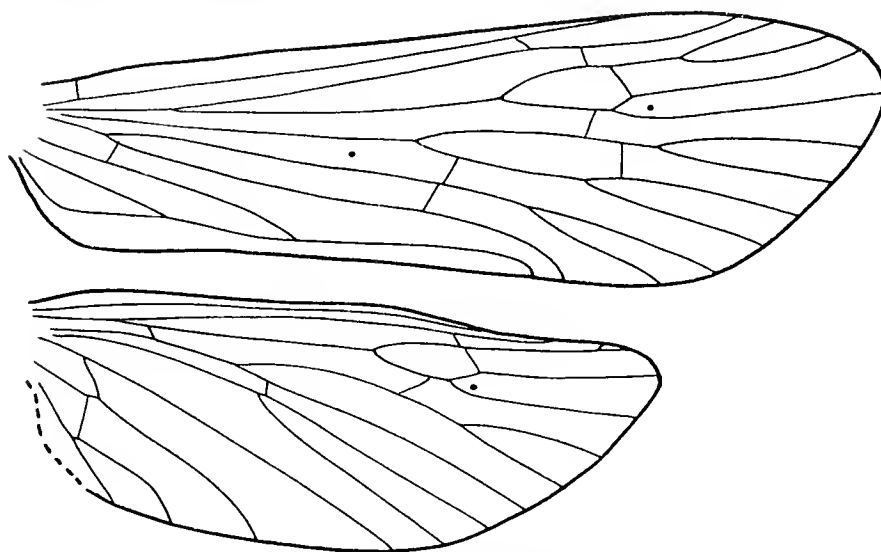


HYDROPSYCHIDAE.

Cheumatopsyche diminuta (Walker).

(Fig. 92.)

1852. *Hydropsyche diminuta* Walker, Cat. Neur. Brit. Mus. : 115.
 1864. *Hydropsyche diminuta* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 822.
 1905. *Hydropsyche diminuta* Ulmer, Ann. Soc. Ent. Belg., **49** : 35.
 1907. *Hydropsychodes diminuta* Ulmer, Genera Insect., fase. **60a** : 174.
 1908. *Hydropsychodes diminuta* Ulmer, Wiss. Ergebn. Schwed. Zool. Exp. Kilimandjaro, Meru. Trichoptera : 9, 10.
 1912. *Hydropsychodes diminuta* Ulmer, Deutsch. Zentralafr. Exped., iv : 93.
 1913. *Hydropsychodes diminuta* Ulmer, Ann. S. African Mus., **10** : 191.
 1919. *Hydropsychodes diminuta* Lestage, Rev. Zool. Afr., vi : 288.
 1925. *Hydropsychodes diminuta* Ulmer, Denks. Ak. Wiss. Wien, **99** : 2.
 1931. *Hydropsychodes diminuta* Ulmer, Deutsch. Ent. Zeitschr., **1931** : 16-18, figs. 13-15.
 1934. *Hydropsychodes diminuta* Barnard, Trans. R. Soc. S. Afr., **21** : 360.
 1939. *Cheumatopsyche diminuta* Mosely, Ruwenzori Expedition, 1934-5 (British Museum), **3** : 27.

FIG. 92.—*Cheumatopsyche diminuta* Walk. ♀ : wings.

Walker describes the species as follows :

“*Nigra, ferrugineo-hirta ; antennae fulvae, annulis albidis ; palpi pedesque testacei ; alae anticae fusco-cinereae, posticae cinereae.*”

“Black, clothed with ferruginous hairs : antennae tawny, with a whitish ring on each joint : palpi and legs testaceous : fore-wings brownish gray ; hind-wings gray. Length of the body 2 lines ; of the wings $6\frac{1}{2}$ lines.

“*a. Sierra Leone. Presented by the Rev. D. F. Morgan.*”

We add :

Head dark brown, covered with dense, yellow hair ; eyes black in front, lighter posteriorly ; *antennae* (only a few basal joints remain) and *palpi*

brownish yellow ; *thorax* dark brown to black, with some yellow hair ; tegulae covered with yellow hair ; *legs* and spurs brownish yellow, with yellow pubescence ; *wings* brownish, almost wholly denuded ; *abdomen* blackish above, lighter beneath. As is often the case in specimens of this genus, there is a minute fork 1 in the hind wing of the type.

Length of the fore wing, 6 mm.

The type material consists of a single female.

Ulmer (1931) surmised that more than one species has been regarded as the one described by Walker. He tentatively selected as representing Walker's species some specimens in the museum at Brussels, collected in the Congo ; of these he gave descriptions and figures of the male genitalia. The colour description given by Ulmer fits the type well enough, but the latter is in bad condition for comparison. Ulmer stated that the fore wings in his specimens are brownish grey, with a few scattered flecks of golden-yellow hair, the veins dark brown. Barnard (1934) regards Ulmer's specimens as at least in part not identical with *diminuta*.

***Leptonema albobirens* (Walker).**

(Fig. 93.)

- 1852. *Macronema albobirens* Walker, *partim*, Cat. Neur. Brit. Mus. : 76.
- 1861. *Macronema albobirens* Hagen, Syn. Neur. N. Am. : 284 (listed as synonym of *Leptonema pallidum* Guér.).
- 1864. *Macronema albobirens* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 845.
- 1866. *Macronema albobirens* McLachlan, Trans. Ent. Soc. London, (3) 5 : 263, 264, 275 (*albobirens* regarded as distinct from *pallidum*).
- 1905. *Leptonema albobirens* Ulmer, Stett. Ent. Zeit., 66 : 56, 57, pl. 2, figs. 48, 49 ; pl. 3, fig. 102.
- 1907. *Leptonema albobirens* Ulmer, Cat. Coll. Zool. Selys, fasc. 6, pt. 1 : 59.
- 1907. *Leptonema albobirens* Ulmer, Genera Insect., fasc. 60a : 163.
- 1908. *Leptonema albobirens* Ulmer, Cat. Coll. Zool. Selys, fasc. 6, pt. 2 : 48, fig. 42.
- 1913. *Leptonema albobirens* Ulmer, Deutsch. Ent. Zeitschr., 1913 : 394, 407.
- 1914. *Leptonema albobirens* Banks, Ent. News, 25 : 150.
- 1933. *Leptonema albobirens* Mosely, Revision of the genus *Leptonema* (British Museum) : 45, figs. 123-130.

Walker describes the species as follows :

" *Viridi-alba ; antennis palpisque testaceis, illis fusco annulatis et terminatis.*

" Whitish, with a slight green tinge : palpi testaceous : antennae testaceous, with a brown ring on each joint, and wholly brown towards the tips, more than thrice the length of the body : tarsi testaceous : veins of the wings greenish. Length of the body 3-4 lines ; of the wings 12-16 lines.

" *a-e.* Venezuela. From Mr. Dyson's collection.

" *f-?* From Mr. Children's collection."

We add :

Head ochraceous, clothed with whitish hairs ; *antennae* ochraceous, with

rather darker annulations; palpi ochraceous; *wings* hyaline, with greenish neuration; *legs* ochraceous; *abdomen* ochraceous, paler beneath.

Genitalia, male.—Last dorsal segment fringed with strong hairs and produced

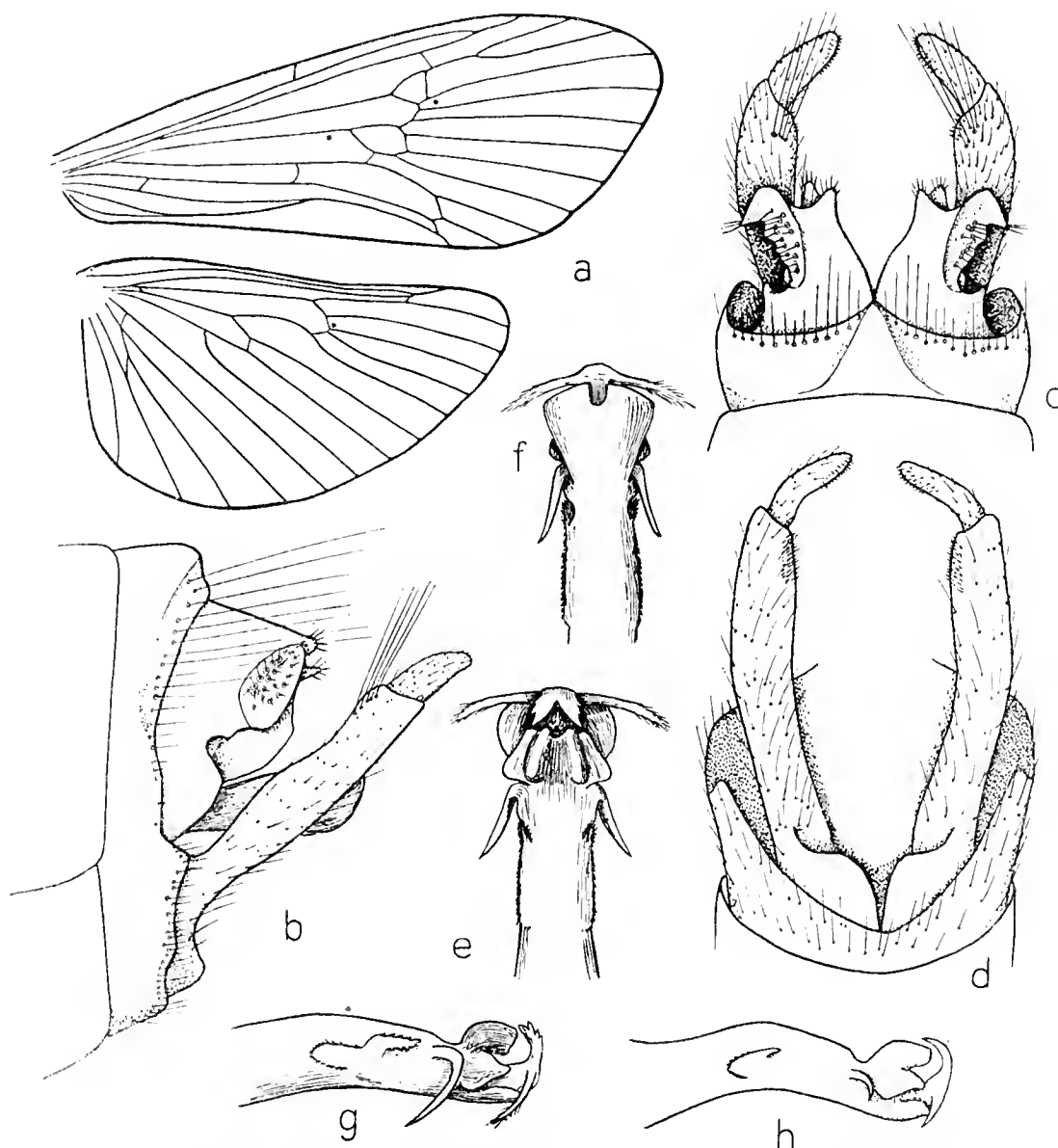


FIG. 93.—*Leptonema albovirens* Walk. ♂. *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral; *e*, penis, dorsal, *f*, ventral, *g*, lateral, *h*, lateral, extreme variable form from Cuernavaco.

to an acute angle from which the margin of the segment falls back in shallow excisions; intermediate appendages from above, broad, lightly chitinated and semi-transparent, each with the apical margin deeply excised; the outer angle bearing some resemblance to a bird's head, inner angle forming a triangular point armed with three or four strong hairs, lateral margin sinuate with a

semicircular excision towards the base; from the lower surface of each appendage towards the apex, a small process arises and is seen below the excision of the margin; this process also is furnished with strong hairs; the appendages appear to be united at the base and slope outwards so that their inner sides are widely separated; from the side they are very wide at the base, apices broadly truncate, each carrying towards the upper angle two small processes directed tailward; towards the apex is an oval plate, somewhat punctate, bordered by a strongly chitinized margin and turned slightly outward; penis at the apex, divided into two portions, an upper and a lower; the upper terminates in a strongly chitinized lobe, from the side, truncate at the apex; from above, strongly grooved and very wide, with the lower lateral margins extending in lightly chitinized shelves; at the base of the lobe, slightly towards the base of the penis, arises a pair of strong hooks curving downwards and basalwards; still nearer the base of the penis, and on each side of the stem, is a pair of serrated plates or processes of which the apical plate is slightly outstanding; the lower apical portion of the penis is produced beyond the upper and carries two pairs of processes; at the extreme apex, a pair, short, broad and foliated, from the side directed upwards and towards the base of the penis, the second pair being more or less a continuation of the upper pair and curving downward as seen from the side; from above, extending nearly horizontally outward; from beneath, there is seen a broad plate towards the apex of the penis with a deep U-shaped excision at the centre of its apical margin; inferior appendages two-jointed, terminal joint rather short, basal joint gradually dilating towards the centre, narrowing again to a truncate apex; at the bases, seen from beneath, are two rounded plate-like projections meeting each other in a deep cleft and from the side, forming a blunt projection at the base of the appendage.

There is an example of *albovirens* from Cuernavaco, Mexico, of which we give a figure, in Mr. Banks's collection. In this the parts of the penis are somewhat modified, particularly in that the hooks at the base of the strongly chitinized upper lobe are much abbreviated.

The female may be distinguished by the presence of a small yellowish spot at the centre of the first costula of the posterior wing.

Length of the fore wing, male, 15.5 mm.; female, 18 mm.

Of the Walker material, there are now in the British Museum, from Venezuela, Mr. Dyson's collection, one male, the type, mounted in balsam; one male with the abdomen almost entirely devoured by pests; one example, sex unknown, with only the fore wings, head, thorax and fore legs remaining; one male, described below as *Leptonema ulmeri* sp. n. and the single example (*f*—locality unknown), from the Children collection, a female. The identity of the female and of the incomplete specimen must necessarily be uncertain.

It has been suggested that *L. albovirens* Walker may possibly be synonymous with *L. pallidum* Guérin. An example of the latter species, from Brazil, found in the McLachlan collection, indicates that *albovirens* is distinct while *pallidum* is the species described by Ulmer under the name *furcatum* (Mosely, 1939, Ann. Mag. Nat. Hist., ser. 11, 4, pp. 310–314).

Leptonema ulmeri Moscly.

(Fig. 94.)

1852. *Macronema albovirens*, Walker *partim*, Cat. Neur. Brit. Mus. : 76.1933. *Leptonema ulmeri* Mosely, Revision of the genus *Leptonema* (British Museum) : 39, figs. 100-105.

This insect was included in the series of *Leptonema albovirens* which Walker described as follows :

“ *Viridi-alba ; antennis palpisque testaceis, illis fusco annulatis et terminatis.*

“ Whitish, with a slight green tinge : palpi testaceous : antennae testaceous, with a brown ring on each joint, and wholly brown towards the tips, more than thrice the length of the body : tarsi testaceous : veins of the wings greenish. Length of the body 3-4 lines ; of the wings 12-16 lines.

“ *a-e.* Venezuela. From Mr. Dyson's collection.”

We add :

This species is a clear-winged pale ochraceous insect presenting no special outward characters by which it can be separated from other species of its group.

Genitalia, male.—Margin of the last dorsal segment armed with a fringe of strong hairs and produced in the centre, apex slightly excised ; the upper surface is raised to form a strongly chitinated triangular plate, very prominent in the dried example ; intermediate appendages from above, large, somewhat quadrilateral, hinder margin sinuate and serrate, a strong branch arising towards the middle of each outer margin ; at the inner hinder angle there is a finger-like process directed inward and upward ; at the base of each appendage, viewed dorsally, is a nearly rectangular process with a very serrate outer margin ; from the side, the appendages are seen to consist of a strongly chitinated bifurcate outer and a lightly chitinated, membranous inner portion which carries the upturned finger-like process ; the rectangular basal processes are seen to be directed upward ; the penis, from the side, carries on its upper surface towards the apex a stout, arched process, curving tailward, upper margin towards the apex serrate ; from above, the process is dilated in the middle, and the basal portion appears trough-shaped ; arising from the upper surface from each side of this process are two pairs of strong spines, the first arching downwards directed towards the base, the second directed towards the base and sloping upward ; immediately beneath these spines are two triangular lateral plates ; the apex of the penis, from the side, terminates in an upturned flap which from above is widely excised ; two short, stout spines are carried on its upper surface a short distance from the apex and directed towards it, apparently enclosed in a thin membrane ; inferior appendages two-jointed, apical joint rather short ; from beneath they are seen to be bifurcate, long, slender branches, arising at the base, very acute at their apices and nearly parallel with one another, from the side rather stout.

Length of fore wing, male, 14.5 mm.

Type, male (Venezuela) is a balsam preparation in the British Museum collection.

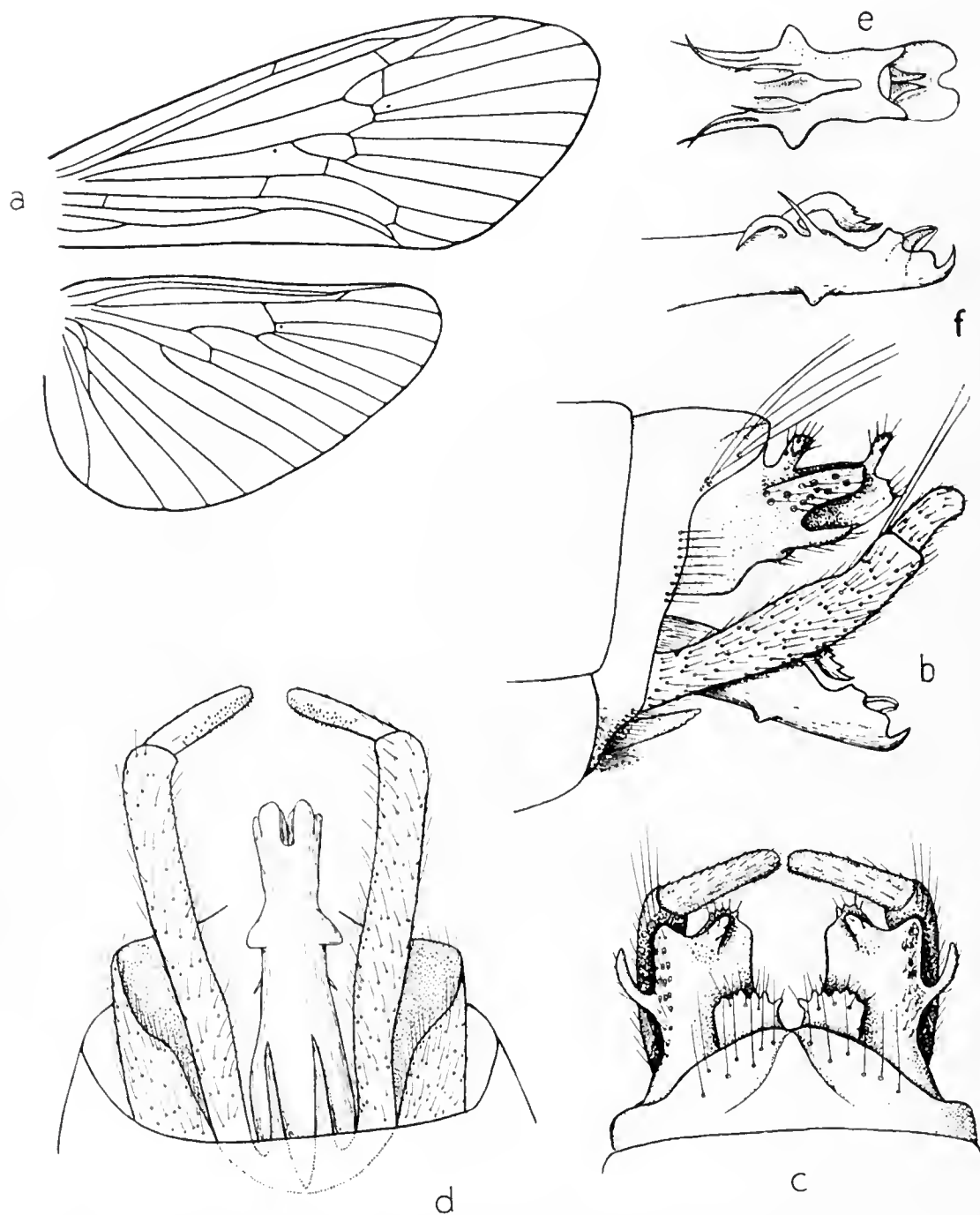


FIG. 94.—*Leptonema ulmeri* Mosely ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral; *e*, penis, dorsal; *f*, lateral.

This insect formed part of a series of six in the British Museum collection described by Walker as *Macronema albovirens*.

Macronema australe McLachlan.

(Fig. 95.)

1852. *Monopseudopsis inscriptus* Walker, Cat. Neur. Brit. Mus. : 105.
 1862. *Macronema australis* McLachlan, Trans. Ent. Soc. London, (3) 1 : 308, 309 (*inscriptus* preoccupied in *Macronema*).
 1864. *Macronema australis* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 845.
 1907. *Macronema australe* Ulmer, Genera Insect., fase. 60a : 165.
 1908. *Macronema australe* Ulmer, Cat. Coll. Zool. Selys, fase. 6, pt. 2 : 102, pl. 6, fig. 38.

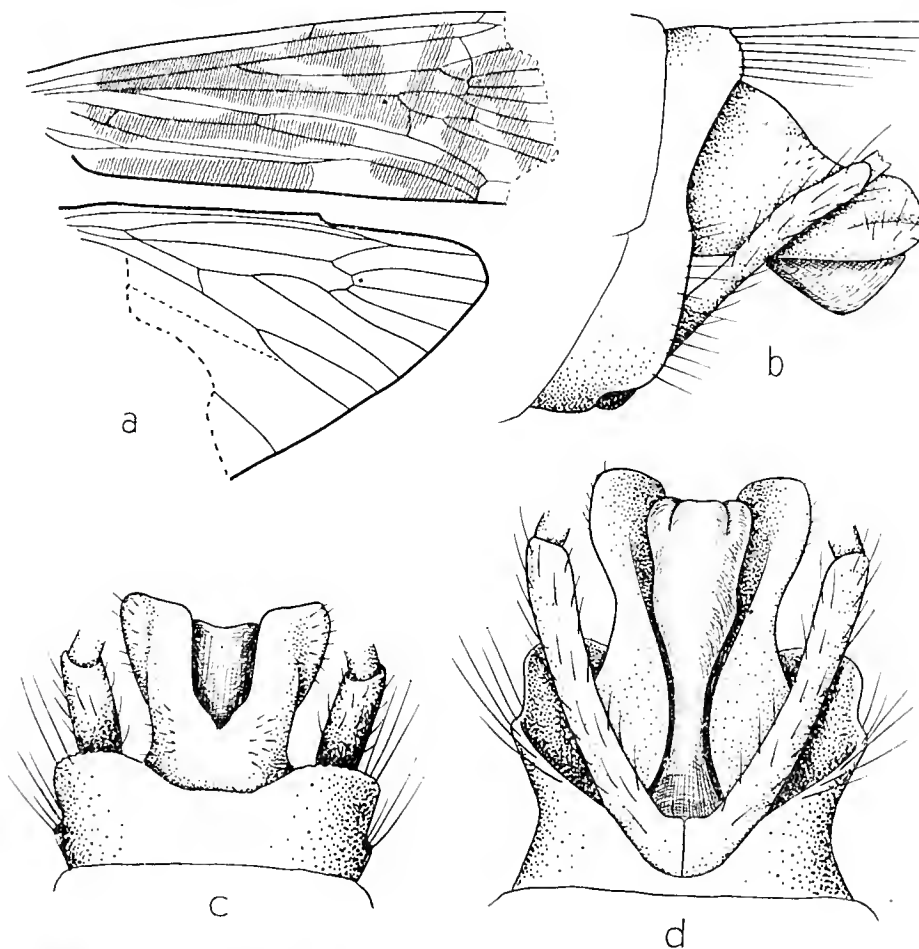


FIG. 95.—*Macronema australe* McLach. ♂ : *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

Walker describes the species as follows :

“ *Niger* ; *pedes flavi* ; *alae anticae luridae*, *maculis vittisque flavis maculaque subapicali hyalina ornatae* ; *alae posticae subcinereae*.

“ Black, with a slight hoary tinge : head clothed with short black hairs above, with ferruginous hairs beneath : antennae longer than the body ; second, third, and fourth joints ferruginous : palpi and legs yellow : fore-wings lurid, with three yellow stripes, one on each border and one on the disk, and with six large irregularly-triangular yellow spots, three resting on each border ; tips gray, with a large almost round hyaline spot in the disk : hind-wings pale gray, with two almost colourless marks

near the tip of the fore border; veins pale. Length of the body $4\frac{1}{2}$ lines; of the wings 14 lines.

"a. New Holland. Presented by the Entomological Club."

We add:

Head black above, the large warts back of the antennae very dark brown, the smaller warts near the hind margin more yellowish; face dark brown, with tawny hair; *antennae* (but three joints remaining) dark brown, the basal joint almost black; palpi yellow; prothorax yellow, the mesonotum and the metanotum black; *fore legs* yellow except for a dark brown spot at the distal ends of the tibiae; *middle legs* wanting; *hind legs* (incomplete) yellow, the femora a little darker; spurs 2-4-4.; *fore wings* (incomplete) with a pattern of brown and very light yellow, represented in Fig. 95, and shown with a fair degree of accuracy in Mr. Horace Knight's coloured figure in Ulmer's monograph of the subfamily Macronematinae (1908, pl. 6, fig. 38); *abdomen* dark brown, the genital appendages yellow.

Fore wings not complete, length about 14 mm.

Genitalia, male.—Apical margin of the 9th tergite widely and shallowly excised at its centre; below it is an upper penis-cover, widely forked, apices of the forks truncate; penis arises from a slender stem, apex dilated and somewhat elongated, apical margin truncate; inferior appendages two-jointed, broken in the type.

There is a single male type. McLachlan (1862) noted that the specimen was in very bad condition and he placed the species in a group with *M. zebratum*, *hospitum*, *sepultum*, and others having in the fore wings whitish hyaline markings upon a dark ground.

Macronema capense Walker.

(Figs. 96-99.)

- 1852. *Macronema capensis* Walker, Cat. Neur. Brit. Mus. . 77.
- 1852. *Macronema signata* Walker, Cat. Neur. Brit. Mus. : 77.
- 1852. *Macronema inscripta* Walker, Cat. Neur. Brit. Mus. : 77.
- 1852. *Macronema pulcherrima* Walker, Cat. Neur. Brit. Mus. : 77.
- 1864. *Macronema capensis* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 845.
- 1864. *Macronema inscripta* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 845.
- 1864. *Macronema pulcherrima* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 846.
- 1864. *Macronema signata* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 846.
- 1866. *Macronema signata* McLachlan, Trans. Ent. Soc. London. (3) 5 : 264 (*inscripta* and *pulcherrima* are held to be certainly identical, and *signata* probably so).
- 1897. *Macronema sansibarica* Kolbe, Deutsch.-Ost.-Afrika, 4, Netzfl. : 39.
- 1904. *Macronema sjostedti* Ulmer, Arkiv f. Zool., 1 : 419-421, fig. 9.
- 1905. *Macronema inscriptum* Ulmer, Ann. Soc. Ent. Belg., 49 : 31-33, figs. 19, 20.
- 1906. *Macronema signatum* Ulmer, Notes Leyden Mus., 28 : 65 (identifies *inscriptum* as a variety of *signatum*).
- 1906. *Macronema capense* Ulmer, Notes Leyden Mus., 28 : 74, fig. 75.
- 1907. *Macronema capense* Ulmer, Genera Insect., fasc. 60a : 166, pl. 22, fig. 206.
- 1907. *Macronema pulcherrimum* Ulmer, Genera Insect., fasc. 60a : 166.

1907. *Macronema signatum* Ulmer, Genera Insect., fasc. 60a : 166.
 1907. *Macronema sansibaricum* Ulmer, Genera Insect., fasc. 60a : 166.
 1907. *Macronema sjostedti* Ulmer, Genera Insect., fasc. 60a : 166.
 1908. *Macronema capense* Ulmer, Cat. Coll. Zool. Selys, fasc. 6, pt. 2 : 63, 65, 100, 104-107, fig. 108, pl. 5, fig. 32 (lists as synonyms *sansibaricum*, *signatum*, pl. 5, fig. 34, *sjostedti*, pl. 5, fig. 33, *pulcherrimum*, pl. 5, fig. 35, and *inscriptum*, pl. 5, fig. 36).
 1912. *Macronema capense* Ulmer, Deutsch. Zentralafrika Exped., 4 : 99, 100.
 1919. *Macronema capense* Lestage, Rev. Zool. Afric., 6 : 307.
 1919. *Macronema signatum* Lestage, Rev. Zool. Afric., 6 : 307.
 1919. *Macronema sjostedti* Lestage, Rev. Zool. Afric., 6 : 308.
 1919. *Macronema pulcherrimum* Lestage, Rev. Zool. Afric., 6 : 308.
 1919. *Macronema inscriptum* Lestage, Rev. Zool. Afric., 6 : 308.
 1930. *Macronema capense* Navás, Rev. Zool. Bot. Afr., 19 : 331, fig. 46.
 1931. *Macronema capense* Navás, Rev. Zool. Bot. Afr., 21 : 141.
 1931. *Macronema rhodesianum* Ulmer, Deutsch. Ent. Zeitschr. 1931 : 14, 15, fig. 12.
 1932. *Macronema capense* Navás, Rev. Zool. Bot. Afr., 22 : 228.
 1934. *Macronema capense* Barnard, Trans. R. Soc. S. Afr., 21 : 372, fig. 42f, g (*rhodesianum* is listed as a variety).

Walker describes the species as follows :

As *capensis* :

“*Testacea ; antennae nigrae ; abdomen nigricans ; alae subcinereae.*

“Testaceous, slightly pubescent : eyes black ; antennae black, about three the length of the body, tawny at the base : abdomen blackish ; hind borders of the segments and tip testaceous : fore-tibiae with a pair of short apical spurs ; hinder tibiae with two pairs of long spurs : wings very slightly gray ; veins testaceous. Length of the body 4 lines ; of the wings 12 lines.

“*a.* Port Natal. From M. Gueinzus’ collection.”

As *signata* :

“*Fulva ; antennae nigrae ; alae anticae testaceae, fasciis duabus una furcata fuscis, apice cinereae.*

“Tawny, almost without hairs : antennae black, tawny at the base : legs testaceous ; fore-tibiae with a pair of very short spurs at the tips : hinder tibiae with two pair of long spurs, one in the middle, the other at the tips : fore-wings testaceous, gray towards the tips, with two brown bands, one before the middle, oblique, the other nearer the tip, forked towards the fore border : hind-wings slightly gray. Length of the body 3 lines ; of the wings 9 lines.

“*a, b.* Sierra Leone. Presented by the Rev. D. F. Morgan.”

As *inscripta* :

“*Testacea ; antennae nigrae ; alae hyalinae, anticae fasciis duabus fuscis unaque cinerea.*

“Testaceous, almost without hairs : antennae black, testaceous at the base : wings colourless ; veins testaceous ; fore-wings with an oblique brown band about the middle, with a semicircular brown band beyond the middle, and with an irregular pale gray band near the tip. Length of the body $3\frac{1}{2}$ lines ; of the wings 11 lines.

“*a, b.* Sierra Leone. Presented by the Rev. D. F. Morgan.”

As *pulcherrima* :

“*Testacea ; antennae nigrae ; alae hyalinae, anticae testaceo vittatae strigis nonnullis obliquis fuscis.*

"Testaceous, almost without hairs: antennae black, testaceous at the base: wings colourless, with stripes of gilded down about the veins, and with some oblique dark brown streaks, one of them forming a curved band across the wing. Length of the body $2\frac{1}{2}$ lines; of the wings 7 lines.

"*a.* Sierra Leone. Presented by the Rev. D. F. Morgan."

To this we add (for type *capense*):

Head, first two joints of the antennae and the palpi yellow, remainder of the antennal joints brown; eyes black; *thorax* and *legs* yellow; spurs 2-4-4; *fore wings* clear with sparse golden pubescence which is heaviest along the costal margin; two indistinct dark spots bordering R_1 on either side of the cross-

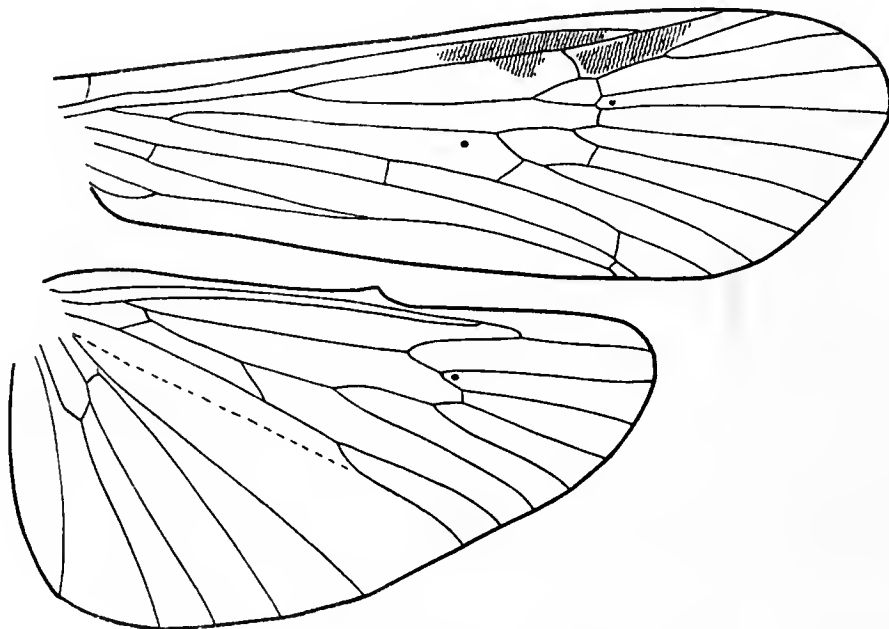


FIG. 96.—*Macronema capense* Walk.: wings.

vein joining R_1 and the discal cell; *hind wings* clear; *abdomen* dark brown, the rear margins of the segments and all of the last segment somewhat lighter. Length of the fore wing, 12 mm.

The species is known to be very variable in colour, and several colour varieties have been described.

Walker's single *M. capense* has no markings on the wings except the two already referred to above; these spots are smaller than in the specimen figured by Ulmer (1908, pl. v, fig. 32), and are anterior to the discal cell; the apical margin is scarcely darker than the remainder of the wing.

Walker's two *M. inscriptum* appear to be bleached, the eyes as well as the head and thorax being whitish, scarcely tinged with yellow. The fore wing has the apex very little darker than the remainder of the wing; there are two transverse dark bands, the more basal of which extends obliquely from R_1 to 3rd A, and is darkest at its anterior end, where a very small lighter dot is

enclosed ; the other more apical band curves from the costal margin opposite the discal cell, passes around the base of that cell and ends at the apex of cell

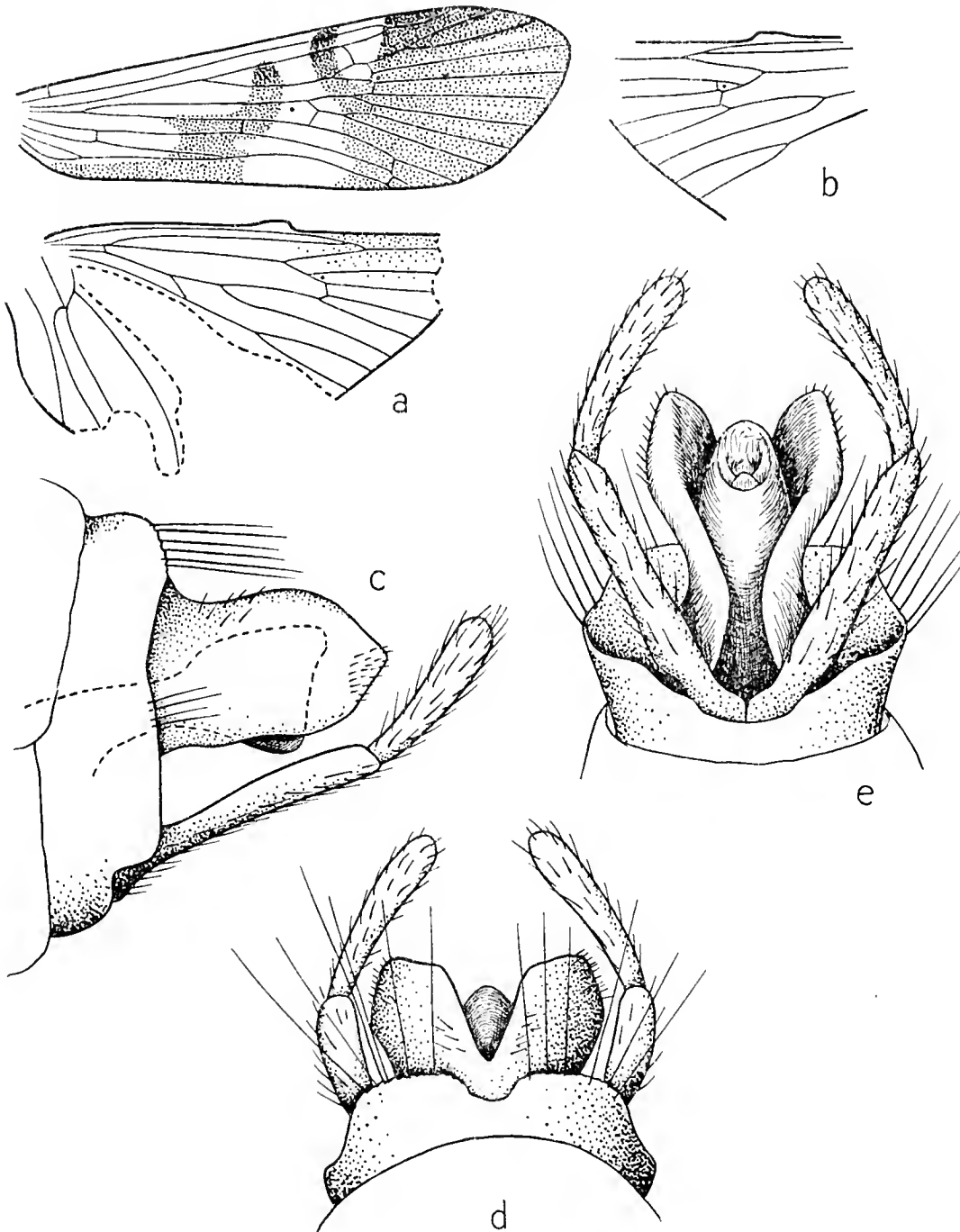


FIG. 97.—*Macronema capense* Walk. var. *signatum* Walk. ♂: a, wings b, apex of left posterior wing; c, genitalia, lateral; d, dorsal; e, ventral.

M₃. The two bands nearly meet on the pedicel of the discal cell. The abdomens of both the specimens are wanting, but judging by the middle legs, one

is a male and the other a female. We designate the male as the type of Walker's *inscriptum*.

From Walker's single *pulcherrimum*, a ♂, the abdomen, the hind wings, the tips of the fore wings and the hind legs are lacking. In the fore wings there are several dark brown markings; one near the base of the wing extends obliquely from R to the base of Cu₁; there is a small fleck at about the same level, back of Cu₂; a small band joins R₁ and the pedicel of the discal cell; another band arises at the costal margin opposite the discal cell and extends in a curve through the bases of the discal cell, cell M₁, cell M₃, and ends in a dark area which covers the tips of M₄, Cu₁, Cu₂ and the anals at the wing margin; still another band extends obliquely from the anterior margin of the wing,

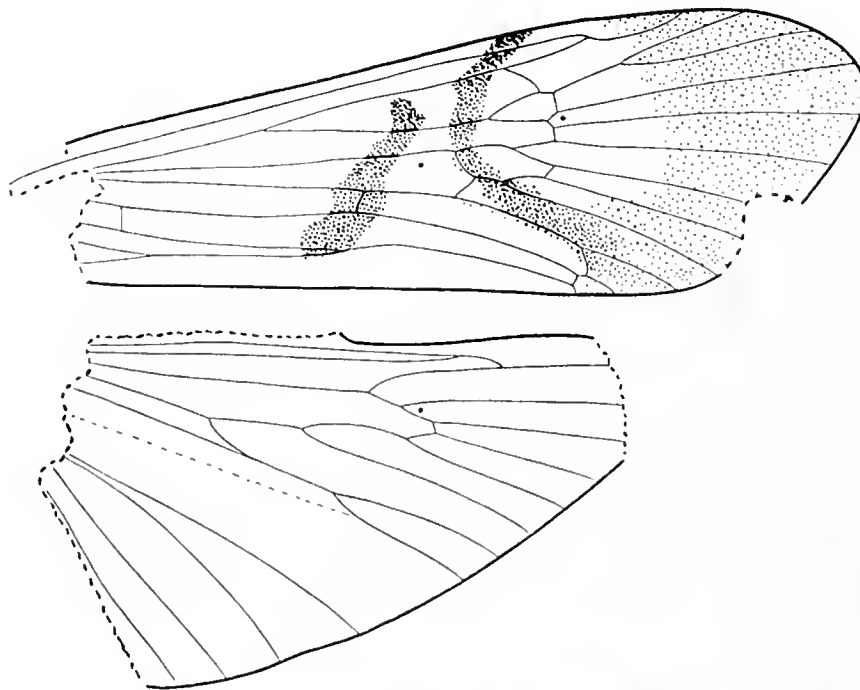


FIG. 98.—*Macronema capense* Walk. var. *inscriptum* Walk. . wings.

crossing the conjoined tip of Sc and R₁, passing along part of R₂, the pedicel of cell R₂, the cross-vein of the discal cell, and the cross-vein r-m. The tips of the wings are lacking. What remains other than the wings agrees well with the description given above for *capense*.

Signatum is decidedly the darkest of Walker's four species. Of the fore wings the apical third is uniformly dark brown; from the basal margin of this dark area a band of the same colour extends to the costal margin and is angled somewhat at the lower margin of the discal cell; a light area is thus enclosed covering most of the discal cell and extending from there to the costal margin. Another dark area borders the posterior margin near the base of the wing, extends broadly to Cu₁ and from that vein it extends as a narrower band to R₁. Hind wings uniformly brown, somewhat lighter than the apices of the fore wings. The head is better preserved in this type

than in the others, and shows a large wart posterior to each antenna, covered with stiff dark hair; the top of the head is nude except for some black hairs on the median line.

Genitalia, male.—Apical margin of the 9th tergite with a somewhat rectangular excision at its centre; upper penis-cover furcate, apices of the forks much dilated; penis arises from a slender stem with a dilated and somewhat oval apex; inferior appendages two-jointed, slender, terminal joints long and slightly dilated at their apices.

The two examples of *signatum* are males. We designate as the type the one with the abdomen mounted in Canada balsam.

The wings of the type *capense* are somewhat larger than those of the other three types; the differences in venation are for the most part very minute, a more striking one being the presence of a cross-vein near the base of cell R_4 of the left hind wing of the type *signatum*, forming a small cell enclosing the

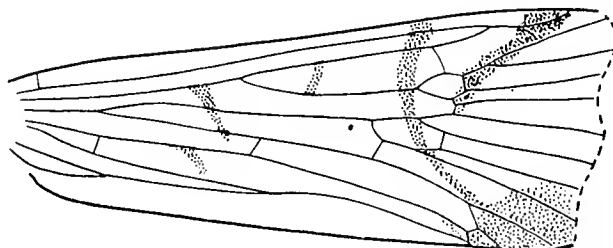


FIG. 99.—*Macronema capense* Walk. var. *pulcherrimum* Walk.: fore wing.

corneous point. This is doubtless an aberration and is not evident in the right wing.

We designate as the type of *Macronema capense* Walker the single specimen, a female, collected at Port Natal.

Ulmer's coloured figures (1908, pl. 5), made after study of a considerable number of specimens, doubtless represent recurring patterns of wing coloration. Walker's types do not happen to be very exactly represented by any of these figures. Of the type of *signatum* in particular it may be said that it would be much better represented by Ulmer's figure of *sjostedti* than by the figure of *signatum* except as regards the shape of the dark area near the middle of the wing.

***Macronema fastosum* Walker.**

(Fig. 100.)

Mystacida fastosa, Brit. Mus. MSS.*

1852. *Macronema fastosa* Walker, Cat. Neur. Brit. Mus.: 76.

1864. *Macronema fastosa* Hagen, Verh. Zool. Bot. Ges. Wien, 14: 845.

1881. *Macronema fasciatum* Albarda, Veth's Midden-Sumatra: 18, pl. 5, fig. 2.

* In the British Museum copy of Walker's Catalogue, there is a manuscript note attributing this reference to Newman.

1905. *Macronema fasciatum* Ulmer, Stett. Ent. Zeit., **66** : 72.
 1906. *Macronema fastosum* Ulmer, Notes Leyden Mus., **28** : 73, 74 (*fasciatum* reduced to synonymy).
 1907. *Macronema fastosum* Ulmer, Genera Insect., fase. **60a** : 165, pl. 39, fig. 7.
 1908. *Macronema fastosum* Ulmer, Cat. Coll. Zool. Selys, fase. **6**, pt. 2 : 63, 66, 100, 101, fig. 106, pl. 5, figs. 30, 31.
 1909. *Macronema fastosum* Betten, Rec. Indian Mus., **3** : 232, fig. A, pl. 14, figs. 4-7.
 1910. *Macronema fastosum* Ulmer, Notes Leyden Mus., **32** : 56.
 1911. *Macronema fastosum* Ulmer, Deutsch. Ent. Zeitschr., **1911**, 397.
 1920. *Macronema quinquepunctatum* Banks, Mus. Comp. Zool. Bull., **64** : 354, 355.
 1930. *Macronema fastosum* Ulmer, Treubia, **11** : 386, 387 (*quinquepunctatum* reduced to synonymy), 437.
 1931. *Macronema fastosum* Banks, Journ. Fed. Malay Museums, **16** : 396, 397.
 1935. *Macronema fastosum* var. *fuscum* Martynov, Rec. Indian Mus., **37** : 188, 189, fig. 92.
 1935. *Macronema fastosum* var. *bifasciatum* Martynov, Rec. Indian Mus., **37** : 189.

Walker describes the species as follows :

“*Lutea* ; *antennae nigrae* ; *alae anticae nigro bifasciatae apice cinereae, posticae apice nigrae*.”

“Pale luteous : antennae black, luteous at the base, about thrice the length of the body : fore-tibiae and fore-tarsi black : fore-tibiae with two very short apical spurs : posterior tibiae with two pairs of long spurs ; middle tibiae with one pair above the middle ; hind-tibiae deeply fringed, with one pair at three-fourths of the length : fore-wings with two black bands, one before the middle, the other irregular and slightly curved near the tips, which are gray : hind-wings paler with blackish tips. Length of the body 5 lines ; of the wings 15 lines.

“*a. Hong Kong, China. Presented by J. Bowring, Esq.*”

To this we add :

Head, thorax and abdomen pale yellow, the thorax brownish ; warts posterior to the antennae covered with yellow hair, the warts nearer to the hind margin of the head less densely covered ; *antennae* with 1st and 2nd joints yellow, the next ten joints black, the remainder somewhat lighter in colour ; palpi yellow ; *legs* mostly yellow, the fore legs, particularly the tibiae and tarsi, brown, in the middle legs the distal ends of the tibiae and of the tarsal joints brown ; spurs 2-4-4 ; *fore wings* yellow, the yellow pubescence heaviest along the costal margin ; the tips are brown, the veins in them particularly dark, the colour lightening somewhat toward the apices ; a dark transverse band in the middle of the clear part of the wing, extending from R_1 to the rear margin ; *hind wings* clear except the extreme tips, which are light brown.

Length of the fore wing, 16 mm.

Genitalia, male.—Apical margin of the 9th tergite straight, with a rounded, shallow bulge at each angle ; upper penis-cover scarcely furcate, but widely excised to leave a pair of rounded wings ; penis arising from a slender stem, apex dilated with a central projection of the apical margin ; inferior appendages two-jointed, terminal joint very long and slender, apex from above slightly dilated.

There is a single male type, the wings and genitalia of which are here figured.

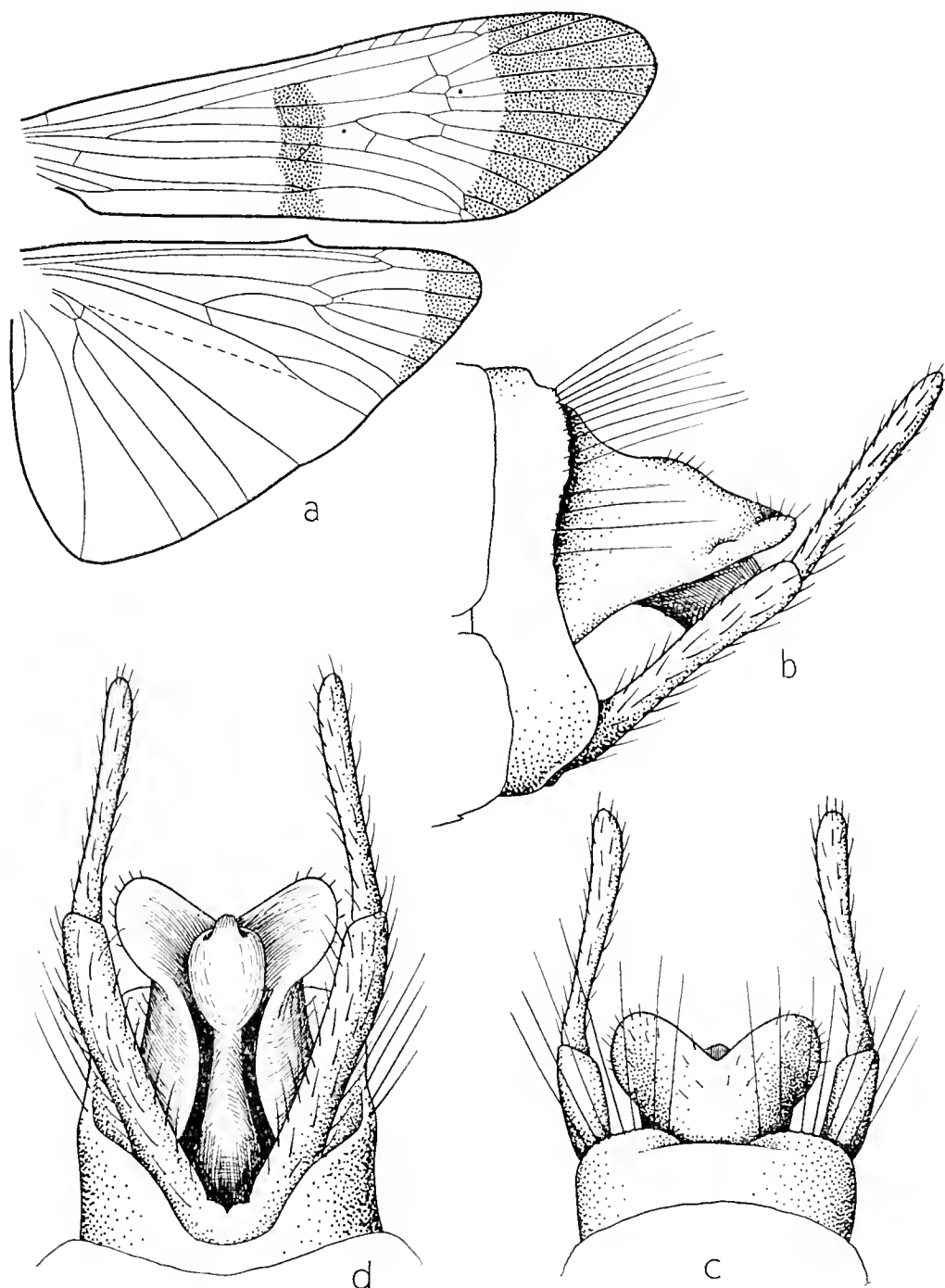


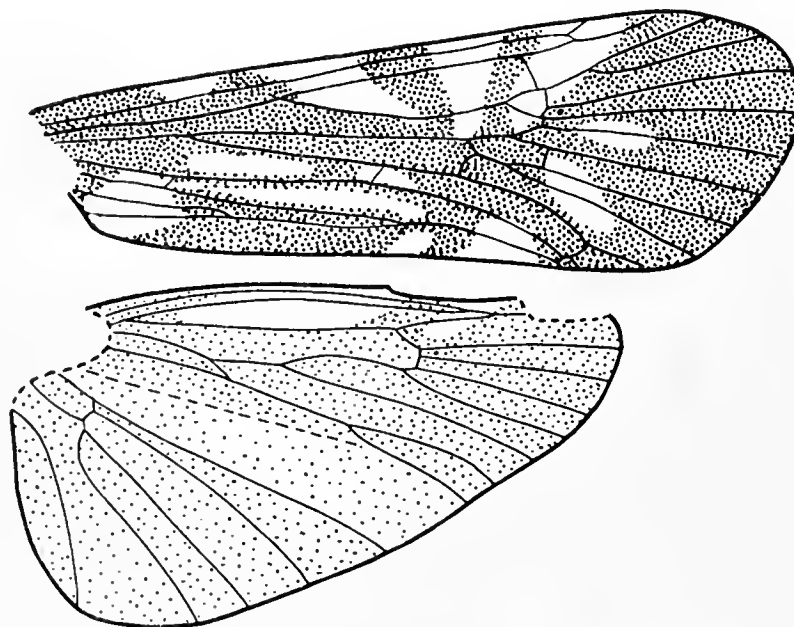
FIG. 100.—*Macronema fastosum* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

The species is apparently not uncommon; it is variable in coloration, and several colour varieties are described. Uhner's coloured figures (1907, pl. 39, fig. 7; 1908, pl. 5, fig. 31) represent Walker's type-specimen accurately.

Macronema multifarium (Walker).

(Fig. 101.)

1852. *Hydropsyche multifaria* Walker, Cat. Neur. Brit. Mus. : 115.
 1858. *Macronema multifarium* Hagen, Verh. Zool. Bot. Ges. Wien, 8 : 484.
 1864. *Macronema multifarium* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 845.
 1866. *Macronema multifarium* McLachlan, Trans. Ent. Soc. London, (3) 5 : 264.
 1906. *Macronema multifarium* Ulmer, Notes Leyden Mus., 28 : 108.
 1907. *Macronema multifarium* Ulmer, Genera Insect., fasc. 60a : 165.
 1908. *Macronema multifarium* Ulmer, Cat. Coll. Zool. Selys, fasc. 6, pt. 2 : 96, pl. 6, fig. 37.

FIG. 101.—*Macronema multifarium* Walk : wings.

Walker describes the species as follows :

“*Nigra* ; *caput testaceum, nigro fasciatum* ; *antennae fulvae, nigro testaceoque fasciatae* ; *pedes testacei, tibiis posticis nigris* ; *alae fuscae, flavo maculatae*.

“Black, shining : head luteous, testaceous beneath, with a black band between the eyes : antennae black towards the base, which is luteous, with a broad pale testaceous band in the middle, tawny from thence to the tips : legs pale testaceous ; tips of tibiae and of tarsi black ; hind-tarsi black, except at the base : fore-wings brown, with four triangular yellow spots on the fore border, and with seven others of various size and shape in the disk or on the hind border ; hind-wings pale brown, pale yellow along the fore border. Length of the body 4 lines ; of the wings 10 lines.

“*a. Ceylon. Presented by William Templeton, Esq.*”

We add :

Head black above, the warts back of the antennae and the larger warts at the posterior angles of the head yellow ; face reddish brown ; *antennae* with

the basal joints pale, the next succeeding joints dark brown, the last segments paler (antennae not complete); palpi yellow; *thorax* black above; *legs* yellow, the hind femur brown (but one hind leg remains); spurs 2-4-4; *fore wings* brown, with somewhat wedge-shaped pale areas radiating from the centre of the wings; in the posterior basal angle there is a large round pale spot which from its anterior edge is continued into a pale band between Cu_2 and 1st A; another pale band anterior to Cu_2 , interrupted in the middle by a dark brown spot; the brown areas all covered with black hair; *hind wings* brown with the costal margin pale; the vein Cu_1 , as in other species, appears greatly thickened at base and is a prominent feature of the wing.

Length of the fore wing, 10 mm.

There is a single type of which the abdomen is missing but, as the femora are not much dilated, the specimen is probably a male. The figure drawn from the type by Mr. Horace Knight for Ulmer's paper on the subfamily Macronematinae (1908, pl. 6, fig. 37) is a faithful representation, except that there should be an additional pale area extending toward the wing apex.

Macronema percitans Walker.

(Fig. 102.)

- 1860. *Macronema percitans* Walker, Trans. Ent. Soc. London, (2) 5 : 177, 178.
- 1864. *Macronema percitans* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 846.
- 1866. *Macronema percitans* McLachlan, Trans. Ent. Soc. London, (3) 5 : 276.
- 1907. *Macronema percitans* Ulmer, Genera Insect., fasc. 60a : 165.
- 1908. *Macronema percitans* Ulmer, Cat. Coll. Zool. Selys., fasc. 6, pt. 2 : 73, 74, fig. 77, pl. 2, figs. 13, 14.
- 1912. *Macronema percitans* Martynov, Ann. Mus. Zool. Acad. Imp. Sci., St. Petersburg, 17 : 20.
- 1913. *Macronema percitans* Ulmer, Deutsch. Ent. Zeitschr., 1913 : 395, 396, fig. 14.
- 1915. *Macronema percitans* Döhler, Deutsch. Ent. Zeitschr., 1915 : 403. figs. 9, 10.

Walker describes the species as follows :

"*Mas.*—*Nigra, subtus testacea, capite smaragdino, antennis fulvis corpore quadruplo longioribus, thorace vittis quatuor smaragdinis, abdomine lurido fasciis fuscis, alis anticis fuscis, spatio sub-apical : pallido fusco-nebuloso fasciamque fuscam includente, alis posticis cinereis apice fuscescentibus.*

"*Male.*—Black, testaceous beneath: head with emerald-green tomentum; antennae tawny, very slender, somewhat darker toward the tips, about four times the length of the body; thorax with four emerald-green stripes; abdomen lurid, with brown bands; fore-wings brown, paler along the costa, and with a broad, pale, subapical space, which is slightly mottled with brown, and contains an irregular, brown, almost interrupted band, which towards the costa is darker than the wing elsewhere; hind-wings gray, with brownish tips.

"Length of the body $3\frac{1}{2}$ lines; of the wings 10 lines.

"Amazon Region."

We add :

Head dark brown above, the median and posterior portions covered with emerald-green scales; the large warts posterior to the antennae are a lighter

brown, covered with hair of the same colour; face light brown, sparsely covered with yellow hair; on the median line, between the bases of the antennae is a small round wart with green scales radiating from it anteriorly; *antennae* (incomplete) brown, the basal joint above with black hair and some green scales;

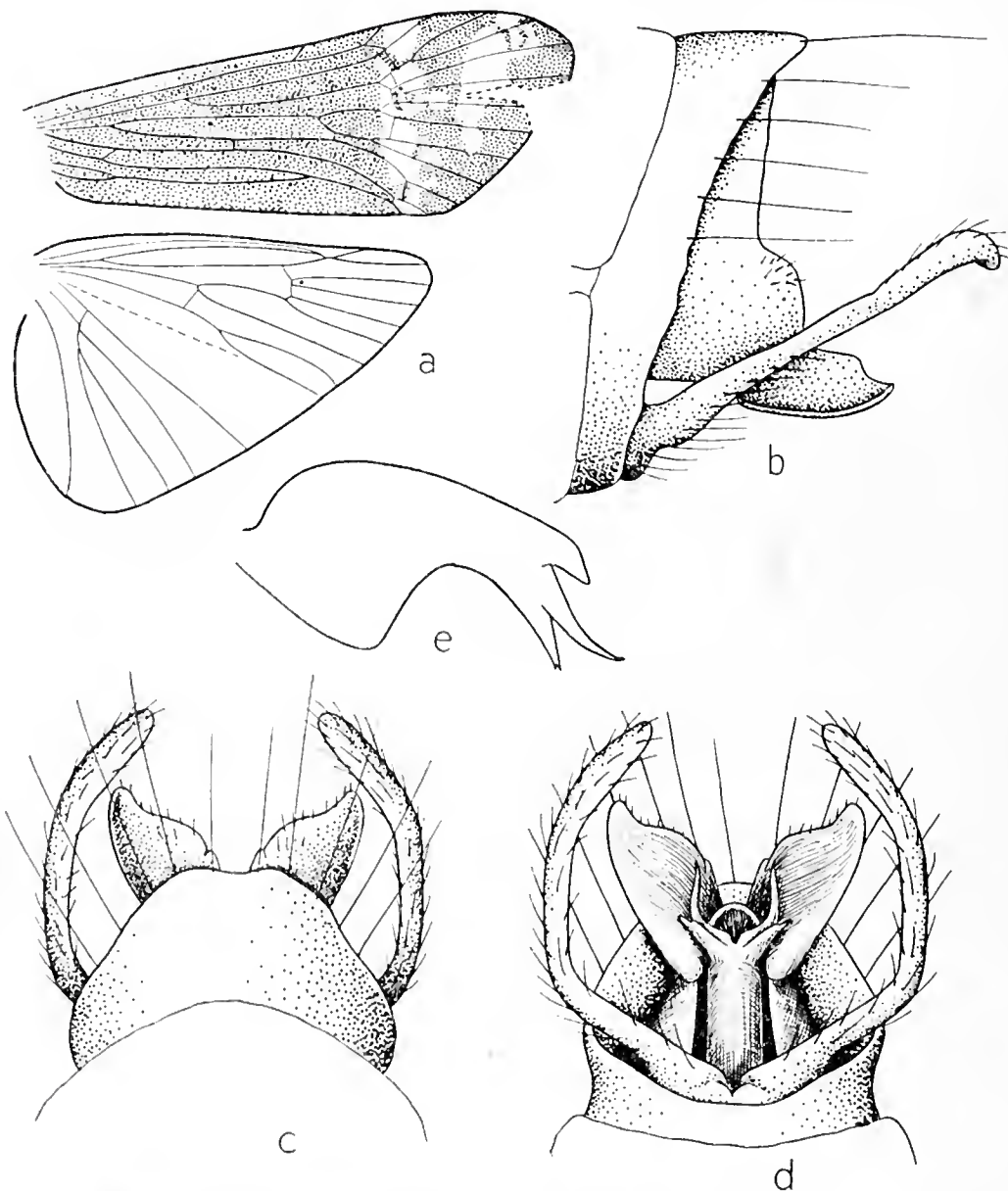


FIG. 102.—*Macroneura perditans* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral; *e*, penis, lateral.

palpi brownish yellow, covered with stiff yellow hairs; pronotum and tegulae black, with long brown hair and with green scales; mesonotum black with a large patch of green scales on either side of the median line (the outermost of Walker's "four emerald-green stripes" are probably the large tegulae); *fore legs* brownish yellow, middle and hind legs with the femora yellow, the

tibiae and tarsi somewhat darker ; spurs 0-4-4 ; *fore wings* brown in the basal two-thirds, the depth of colour increasing somewhat from the anterior to the posterior margin ; from the tip of Sc to the tip of the anal veins there is an irregular pale band across the wing, followed by an interrupted brown area, next by another pale spot, and again by brown at the wing apex, the pale areas somewhat mottled ; the limits of these markings are shown in the figure (Fig. 102), and are well shown in the coloured figure furnished by Mr. Horace Knight for Ulmer's monograph of the subfamily Macronematinae (1908, pl. 2, fig. 14) ; the wings show but little of the covering of green scales referred to in other descriptions, these being now limited to the costal margin, the area along Cu₂, and the bases of the anal veins ; *hind wings* transparent, iridescent, the apex slightly darkened ; Cu₁ and the 2nd and 3rd anal veins are prominent.

Length of the fore wing, 12 mm.

Genitalia, male.—Apical margin of the 9th tergite produced in a hood ; below this is a wide, bifurcate upper penis-cover, upper margins sinuous, a slight projection at the base of each inner margin ; penis short and stout, apex consisting of two pairs of spurs, the upper directed distally, curving slightly upward, the lower widely outspread, stouter, directed distally and downward, apex slightly excised ; from above, there is a rounded hood on the dorsal surface of the apex, slightly curved from the side ; inferior appendages apparently single-jointed.

The type material consists of a single male specimen.

Centromacronema apicale (Walker).

(Fig. 103.)

- 1852. *Macronema* ? *apicalis* Walker, Cat. Neur. Brit. Mus. : 78.
- 1864. *Macronema apicale* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 845.
- 1905. *Centromacronema apicale* Ulmer, Ann. k. k. Natur. Hofmus. Wien, 20 : 87, fig. 57.
- 1907. *Centromacronema apicale* Ulmer, Genera Insect., fasc. 60a : 166, pl. 22, fig. 207a.
- 1908. *Centromacronema apicale* Ulmer, Cat. Coll. Zool. Sclys, fasc. 6, pt. 2 : 115, fig. 117, pl. 6, fig. 42.
- 1912. *Centromacronema apicale* Martynov, Ann. Mus. Zool. Acad. Imp. Sci., St. Petersburg, 17 : 20.
- 1913. *Centromacronema apicale* Ulmer, Deutsch. Ent. Zeitschr., 1913 : 397.

Walker describes the species as follows :

“ *Testacea ; thoracis dorsum nigrum ; alae apice nigricantes.*

“ Testaceous : head wanting : disk of the thorax black, clothed with testaceous hairs : wings clothed with testaceous down, and towards the tips with black down ; hind-wings very iridescent. Length of the body 3 lines ; of the wings 10 lines.

“ *a. Venezuela.* From Mr. Dyson's collection.”

We add :

Head (lacking) ; prothorax black above with a quadrate yellow spot covered with tawny hair on each side of the median line ; mesothorax black, with

sparse yellow pubescence; tegulae yellow, with yellow hair; metathorax dark brown with some yellow hair near the middle; *legs* yellow, the middle tibiae and tarsi somewhat darker; *wings* yellowish at base, brown at the apex, the brown area reaching to the discal cell in the anterior part of the wing and extending further toward the base in the posterior part, the brightest yellow

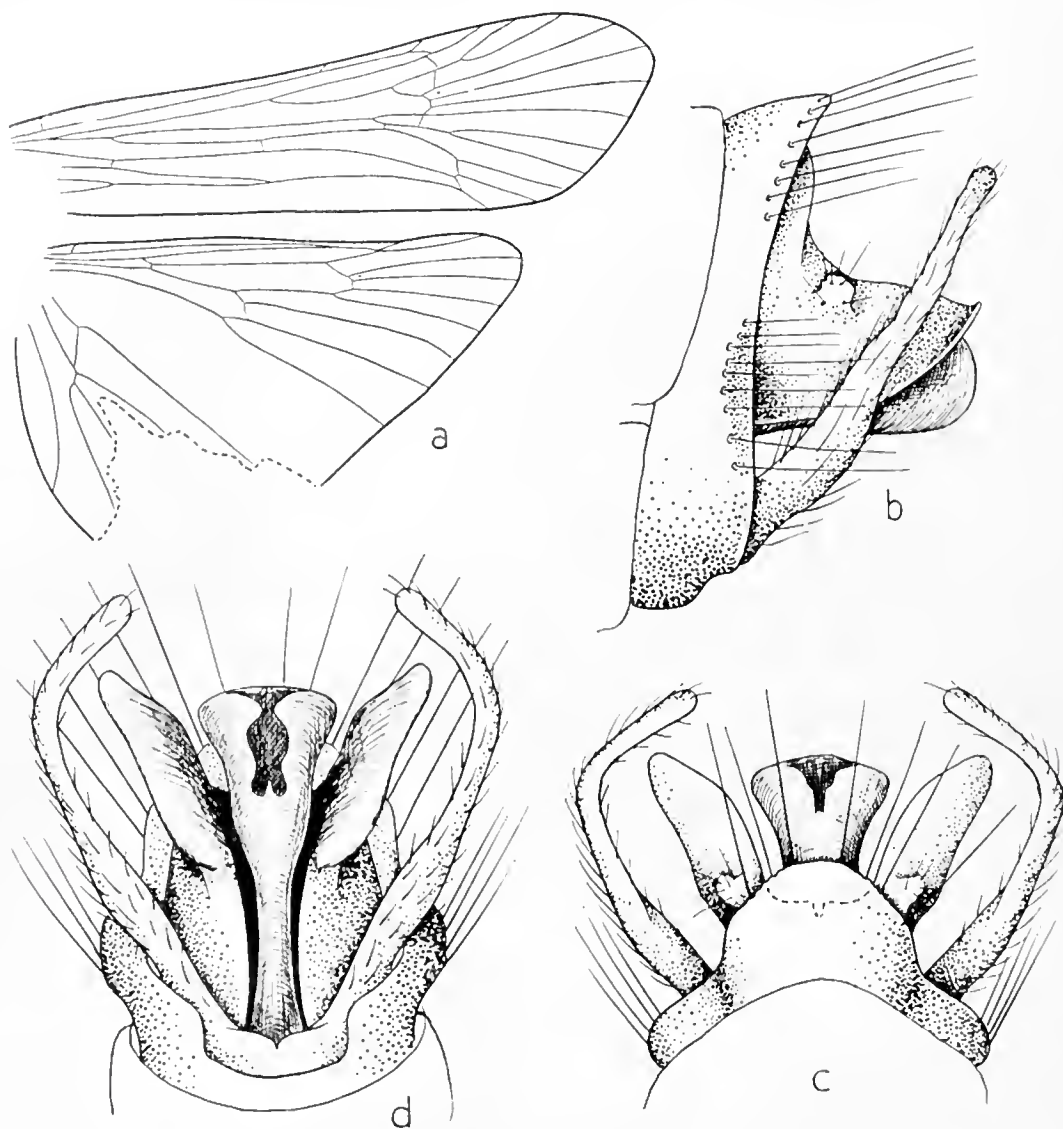


FIG. 103.—*Centromacronema apicale* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

area along the costal margin opposite the discal cell; *hind wings* with the apical third brownish, the anal area iridescent and margined with a fringe of long, yellow hairs; *abdomen* brown.

Length of the fore wing, 11 mm.

Genitalia, male.—Apical margin of the 9th tergite produced in a hood; beneath it is the upper penis-cover with two widely outstretched wings arising from the outer angles of a broad plate and with a hairy wart towards the base

of each wing ; the penis arises from a slender stem, apex widely dilated, apical margin truncate ; inferior appendages single-jointed, slender throughout their length.

The type material is a single, much-damaged male specimen. If there is a cross-vein in media of the fore wing it is very indistinct, and is placed so as to make cell M_3 pedicellate. In any case the structure of tibiae and tarsi of the fore legs leaves no doubt as to the generic position.

Centromacronema oculatum (Walker).

(Fig. 104.)

1852. *Macronema oculata* Walker, Cat. Neur. Brit. Mus. : 75.
 1864. *Macronema oculatum* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 845.
 1905. *Macronema oculatum* Ulmer, Stett. Ent. Zeit., 66 : 84, pl. 2, fig. 72.
 1907. *Centromacronema oculatum* Ulmer, Genera Insect., fasc. 60a : 166.
 1908. *Centromacronema oculatum* Ulmer, Cat. Coll. Zool. Selys, fasc. 6, pt. 2 : 116, fig. 118, pl. 6, fig. 43.
 1915. *Centromacronema oculatum* Döhler, Deutsch. Ent. Zeitschr., 1915 : 404.

Walker describes the species as follows :

“*Testacea ; caput thoracisque dorsum ferruginea, nigro vittata ; antennae nigro annulatae ; alae anticae purpureae, ad costam testaceae, apice fuscae, macula magna rotunda postica ante apicali hyalina ; alae posticae viridi-purpureae.*”

“*Testaceous : head and thorax above ferruginous, the former with two black stripes, the latter with a black disk : antennae more than four times the length of the body ; joints with black bands ; fore-wings purple with gilded down, testaceous along the fore border ; tips brown, with a large round hyaline spot on the hind border : hind-wings purple, partly green. Length of the body 4 lines ; of the wings 12 lines.*”

“*a-c. Venezuela. From Mr. Dyson's collection.*”

We add :

Head (not in good condition) black above, the posterior margin and a median stripe brown, a group of black hairs in the middle and another on each side between the antennae and eye ; face yellow, with yellow hair ; *antennae* very long, the basal joint large, as long as the head, yellow ; the succeeding joints slender, the nine basal ones yellow, with narrow dark rings, the dark increasing until toward the tip the dark area on each joint is greater than the pale ; palpi brownish yellow ; mesonotum and metanotum dark brown to black ; *legs* yellow, with short appressed white hair and short reddish spines ; tarsi of the fore legs inserted before the tips of the tibiae ; spurs 0-4-4 ; *fore and hind wings* mostly purple, brown in some lights ; on the fore wing there is some short golden hair, very dense along the anterior margin and on the apex ; on the postapical margin a large hyaline spot extends from R_5 to the anal angle, but in some lights there is little differentiation between the anterior and the posterior parts of the wing apex ; *abdomen* dark brown above, yellowish beneath.

Length of the fore wing, 12 mm.

Genitalia, male.—Apical margin of the 9th tergite strongly produced and somewhat truncate; upper penis-cover furcate, the broad forks widely outstretched; from beneath, the lower margins of the forks produced in rounded lobes bearing a few sparse hairs; penis with a narrow stem and strongly

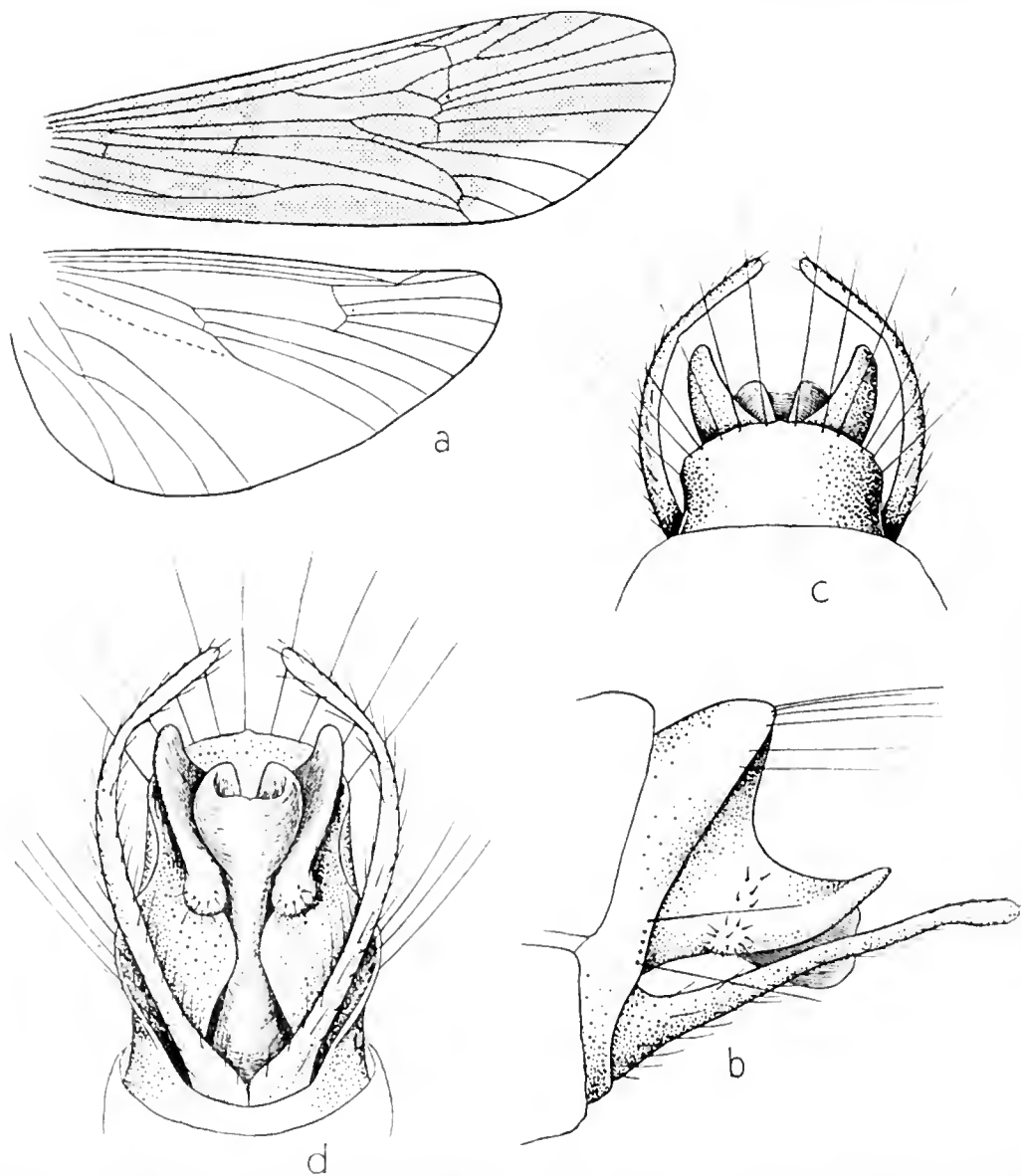


FIG. 104.—*Centromacronema oculatum* Walk. ♂ : *a*, wings ; *b*, genitalia, lateral. *c*, dorsal, *d*, ventral.

dilated apex, the upper margin of which is excised; inferior appendages single-jointed, very long and slender.

We designate as the type the male example with the abdomen mounted in Canada balsam. One paratype was presented to Dr. G. Ulmer, and is now in his collection; a second ♂ paratype is in the British Museum Collection.

Centromacronema auripenne (Rambur).

(Fig. 105.)

1842. *Macronema auripenne* Rambur, Hist. Nat. Insectes. Névropt : 507.
 1852. *Macronema cuprea* Walker, Cat. Neur. Brit. Mus. : 76.
 1859. *Macrostemum auripenne* Kolenati, Gen. et Sp. Trich., 2 : 240, pl. 2, fig. 23.
 1860. *Leptocerus niveistigma* Walker, Trans. Ent. Soc. London, (2) 5 : 176, 177.
 1860. *Leptocerus abjurans* Walker, Trans. Ent. Soc. London, (2) 5 : 177.
 1860. *Leptocerus quadrifurca* Walker, Trans. Ent. Soc. London, (2) 5 : 177.
 1861. *Macronema cupreum* Hagen, Neur. N. Am. : 286 (inquires whether *cupreum* is not the same as *auripenne*).
 1864. *Leptocerus abjurans* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 827.
 1864. *Leptocerus niveistigma* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 830.
 1864. *Macronema cupreum* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 845 (calls attention to possible relationship of *cupreum* to *auripenne*).
 1866. *Macronema abjurans* McLachlan, Trans. Ent. Soc. London, (3) 5 : 264, 275 (removes *abjurans*, *niveistigma* and *quadrifurca* to *Macronema*).
 1901. *Macronema cupreum* Banks, Trans. Ent. Soc. Amer., 27 : 371.
 1905. *Macronema auripenne* Ulmer, Stett. Ent. Zeit., 66 : 81, pl. 2, figs. 68-71.
 1905. *Macronema obscurum* Ulmer, Stett. Ent. Zeit., 66 : 83.
 1905. *Centromacronema auripenne* Ulmer, Ann. k. k. Naturh. Hofmus. Wien, 20 : 86, 88 (*auripenne*, *cupreum*, *obscurum*, *niveistigma*, *abjurans* and *quadrifurca* transferred to *Centromacronema*).
 1907. *Centromacronema auripenne* Ulmer, Cat. Coll. Zool. Selys, fasc. 6, pt. 1 : 62, 63.
 1907. *Centromacronema quadrifurca* Ulmer, Cat. Coll. Zool. Selys, fasc. 6, pt. 1 : 63.
 1907. *Centromacronema abjurans* Ulmer, Genera Insect., fasc. 60a : 166.
 1907. *Centromacronema auripenne* Ulmer, Genera Insect., fasc. 60a : 166, pl. 22, fig. 207b, pl. 39, fig. 3 (*cupreum* listed as a synonym).
 1907. *Centromacronema niveistigma* Ulmer, Genera Insect., fasc. 60a : 166.
 1907. *Centromacronema obscurum* Ulmer, Genera Insect., fasc. 60a : 166.
 1907. *Centromacronema quadrifurca* Ulmer, Genera Insect., fasc. 60a : 166.
 1908. *Centromacronema auripenne* Ulmer, Cat. Coll. Zool. Selys, fasc. 6, pt. 2 : 112-114, figs. 113-116, pl. 6, fig. 41 (lists and describes as synonyms *cupreum*, p. 113, *abjurans*, p. 114, *quadrifurca*, p. 114, *niveistigma*, p. 114, *obscurum*, p. 114).
 1912. *Centromacronema auripenne* Martynov, Ann. Mus. Zool. Acad. Imp. Sci., St. Petersburg, 17 : 21.
 1913. *Centromacronema auripenne* Ulmer, Deutsch. Ent. Zeitschr., 1913 : 397.

Walker's descriptions :

Of *Macronema cuprea* :

"Nigra ; palpis pectore pedibusque fulvis ; alae nigricantes, anticae supra cupreae, posticae ad costam fulvae.

"Black, covered with coppery down : antennae about four times the length of the body : palpi, breast, legs and hind borders of the abdominal segments tawny : wings blackish ; fore-wings covered above with bright coppery down ; hind-wings tawny along the fore border.

"Length of the body $4\frac{1}{2}$ lines ; of the wings 16 lines.

"a. Brazil. Presented by J. P. G. Smith, Esq."

Of *Leptocerus niveistigma* :

"Foem.—Nigra, antennis corpore quadruplo longioribus, alis anticis cinereo-subnebulosis stigmatibus albo oblongo, posticis nigricante cinereis.

"*Female*.—Black : antennae rather slender, about four times longer than the body ; fore-wings indistinctly marked with gray ; stigma white, oblong ; hind-wings blackish-gray.

"Length of the body 4 lines ; of the wings 10 lines.

"Brazil."

Of *Leptocerus abjurans* :

"*Mas.*—*Niger, subtus testaceus, antennis testaceis, fusco-annulatis corpore quadruplo longioribus, alis obscure fuscis cupreo vix nitentibus.*

"*Male*.—Black, testaceous beneath : antennae testaceous, slender, with brown rings, about four times the length of the body ; wings dark brown, with an indistinct cupreous tinge ; hind-wings a little paler than the fore-wings.

"Length of the body 4 lines ; of the wings 12 lines.

"Brazil."

Of *Leptocerus quadrifurca* :

"*Mas.*—*Niger, subtus testaceus, antennis fuscis, abdomine lurido, alis anticis fuscis, vittis duabus striaque transverse subapicali biramosa aureo-tomentosis, alis posticis fuscescente cinereis.*

"*Male*.—Black, testaceous beneath ; antennae brown, slender ; abdomen lurid ; fore-wings brown, with two stripes of gilded tomentum ; one costal, the other discal ; a gilded transverse subapical streak, emitting two branches towards the tip of the wing ; hind-wings brownish-cinereous.

"Length of the body 4 lines ; of the wings 11 lines.

"Brazil."

We add :

Head black above, with some black hair and with golden scales, the latter in the roughly triangular area on each side of the median line not occupied by the large warts ; the median wart immediately behind the antennae is large, black, with golden scales and some black hairs ; the still larger warts adjacent to the eyes are black and covered with black hair ; face brownish yellow, with hair of the same colour ; *antennae* with basal joint brownish black with some scales on the dorsal side, the remaining joints light brown near the base, darker beyond ; *palpi* brownish yellow, with stiff hairs of about the same colour particularly conspicuous on the second joint ; *thorax* black above, the prothorax and tegulae with golden scales, a sparse covering of scales also in a large area on either side of the mesothorax ; *legs* brownish, covered with short, dense pubescence ; as in other species of the genus, the tarsus of the fore leg is inserted before the tip of the tibia ; *fore wings* brown, covered with tawny and with some black hair, presenting in general a bronze cast, more reddish toward the apex ; the veins are dark brown and the costal margin is black ; some marginal dark spots in the apical cells ; *hind wings* uniformly dark brown except for the clear area anterior to the radial sector ; seen by transmitted light the wings are dark brown with darker pubescence ; *abdomen* dark brown, the genitalia lighter in colour ; extending over part of the fifth ventral segment are the lappets described by Ulmer (1905 : 86) as characteristic of the genus ;

in cleared specimens these appear as loops in the chitinous anterior margin of the segment.

Length of the fore wing, 16 mm.

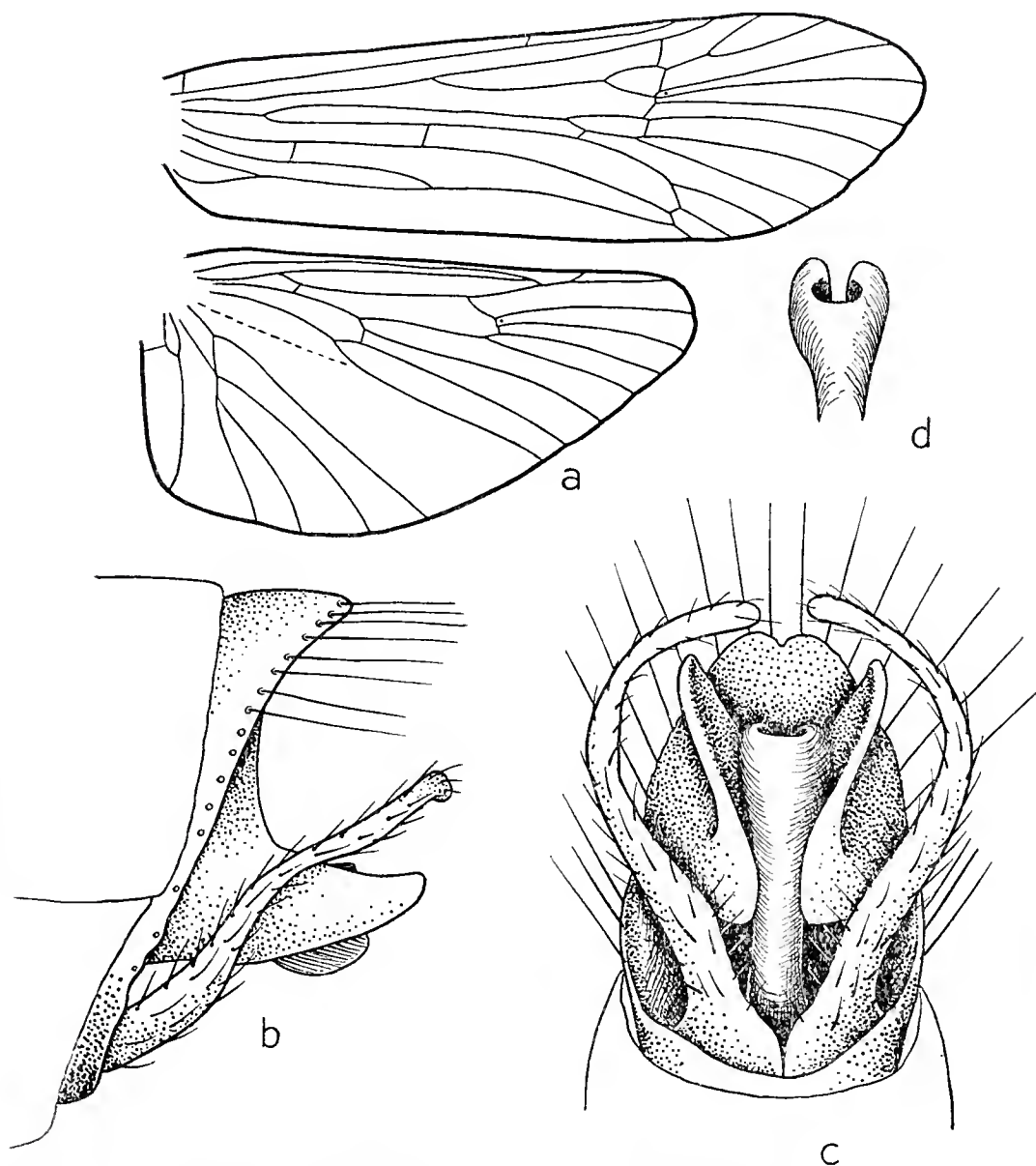


FIG. 105.—*Centromacronema auripenne* Walk. var. *cupreum* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, ventral; *d*, apex of penis, from slightly behind.

Genitalia, male.—The apical margin of the 9th tergite strongly produced and set with long, widely-spaced hairs, apex slightly excised; upper penis-cover forming a pair of outstretched forks, triangular from the side; penis with a dilated apex consisting of a pair of oval plates welded to a somewhat widened cup; stem of the penis very narrow; inferior appendages indistinctly two-jointed, both joints slender, set in the form of a pair of calipers as seen from

above and beneath. The accompanying figure is not quite satisfactory in respect to the apex of the penis and the inferior appendages which have been shown as single-jointed.

This description is from Walker's unique type of *cuprea*, a male.

Walker's type-specimen of *abjurans* is smaller than *cuprea*, and at any rate now wholly lacks the scale hairs which give the latter type its characteristic colour. The antennae of the type *abjurans* are yellow, narrowly ringed with brown; the wings are brown. There is a single type specimen, a male.

Walker's type of *quadrifurca* is not in condition for description. In colour it resembles the type of *abjurans*, but there are some golden scale hairs remaining on the fore wings, these mostly in cell Cu_1 and along the costal margin, a few also along the apical veins in the one wing in which the apex is complete.

Of Walker's type-specimen of *niveistigma* only the head, the prothorax and the mesothorax remain; no yellow scale hairs remain on these parts.

Martynov (1912) questions the reduction of the named varieties to synonymy; Ulmer (1913) concludes that the question can be answered only after examination of more material than is now available, and with this conclusion anyone who examines Walker's types in their present condition can only agree.

Polymorphanisus nigricornis Walker.

(Fig. 106.)

- 1852. *Polymorphanisus nigricornis* Walker, Cat. Neur. Brit. Mus.: 79.
- 1864. *Polymorphanisus nigricornis* Hagen, Verh. Zool. Bot. Ges. Wien, **14**: 875.
- 1872. *Polymorphanisus nigricornis* McLachlan, Ann. Soc. Ent. Belg., **15**: 70.
- 1875. *Oestropsis nigricornis* Brauer, Verh. Zool. Bot. Ges. Wien, **25**: 73.
- 1905. *Polymorphanisus nigricornis* Ulmer, Ann. Soc. Ent. Belg., **49**: 24, fig. 11.
- 1906. *Polymorphanisus nigricornis* Ulmer, Notes Leyden Mus., **28**: 107.
- 1907. *Polymorphanisus nigricornis* Ulmer, Genera Insect., fasc. **60a**: 157.
- 1908. *Polymorphanisus nigricornis* Ulmer, Cat. Coll. Zool. Selys, fasc. **6**, pt. 2: 20, 24, 25, figs. 5, 12.
- 1909. *Polymorphanisus nigricornis* Betten, Rec. Ind. Mus., **3**: 233, pl. 14, figs. 8, 9.
- 1935. *Polymorphanisus nigricornis* Martynov, 1935, Rec. Indian Mus., **37**: 195.
- 1939. *Polymorphanisus nigricornis* Banks, Psyche, **46**: 53.

Walker's description:

"Testaceous; antennae nigrae; alae albidae, venis viridibus.

"Testaceous, clothed with pale hairs: antennae black, about thrice the length of the body, tawny at the base; first joint short, thick: tips of the tibiae black above; tips of the tarsi black, fringed with black hairs; claws black: wings whitish; veins pale green. Length of the body $6\frac{1}{2}$ lines; of the wings 23 lines.

"a. North India. From Mr. Stevens's collection."

To this we add:

Head pale yellow above; there are three large warts, one median, anterior, shield-shaped with a straight anterior margin and tapering posteriorly, and two others between this one and the eyes, these beset with black hairs at the

anterior lateral angles; posterior to each of the large lateral warts there is a prominent ridge, and back of this ridge, on either side, a smaller wart; face

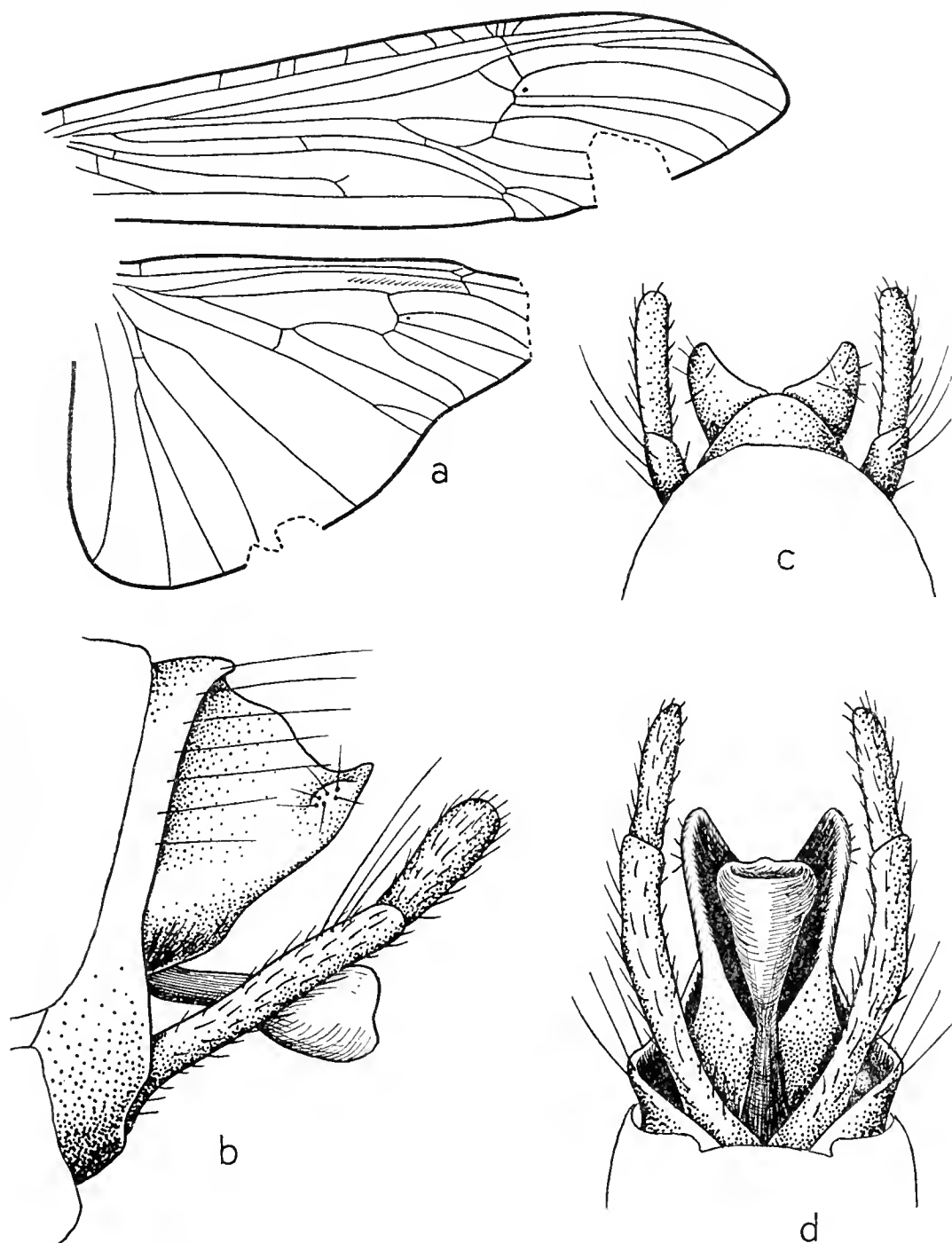


FIG. 106.—*Polymorphanisus nigricornis* Walk. ♂: *a*, wings; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral.

bulbous, yellow, shining; the *antennae* are yellow at base, the remainder reddish brown, narrowly ringed with black; palpi wanting; pronotum pale

yellow, the warts margined with yellow hair; mesonotum and metanotum brownish yellow, with very scant pubescence, the mesonotum with two round black dots; tegulae pale yellow, with long hair of the same colour; *thorax* pale yellow below, hairy; *legs* yellow, the tibiae of the first two pairs tipped with black, the tarsi also with somewhat darkened tips; tibiae and tarsi of the fore legs somewhat dilated, those of the middle legs much dilated; spurs 1-3-3; *wings* whitish, transparent; *abdomen* brownish yellow beneath, the dorsal segments darker along the posterior margins; a dark median stripe is shown above.

Length of the fore wing, 23 mm.

Genitalia, male.—Apical margin of the 9th tergite produced and triangular, apex rounded; upper penis-cover bifurcate, forks elongate, wide and widely outspread; penis with a slender stem and clavate apex; inferior appendages two-jointed, both joints of about the same thickness, terminal joint rather short, dilating slightly towards the apex, from the side.

The single type-specimen is a male.

The identity of Brauer's species *Oestropsis bipunctatus* with *nigricornis* was suspected by Brauer himself, and has been left open to question ever since, partly because of the uncertainty regarding the spur formula, and partly because Walker says the antennae are black and makes no mention of the spots on the mesonotum. It has been shown that there is variation in all these characters in the genus. But in Walker's type-specimen the antennae, if seen against the right background, are clearly brown; the spots are present on the mesothorax though the pin partly obliterates both. The identity of the two species seems wellnigh certain.

Walker states that the palpi of *nigricornis* are very small, and Brauer describes those of *bipunctatus* as rudimentary; these structures are not now shown in the Walker type. McLachlan gives the spurs as 2-3-3; there is but one fore leg remaining, and it appears to have but a single spur.

POLYCENTROPIDAE.

Neureclipsis bimaculata (Linnaeus).

(Fig. 107.)

- 1758. *Phryganea bimaculata* Linnaeus, Syst. Nat. Ed., 10 : 548.
- 1798. *Phryganea tigurinensis* Fabricius, Ent. Syst., Suppl. : 201.
- 1839. *Polycentropus bicolor* Burmeister, Handb. : 914.
- 1852. *Anticyra ? robusta* Walker, Cat. Neur. Brit. Mus. : 122.
- 1859. *Polycentropus bimaculatus* Kolenati, Gen. et Sp. Trich., 2 : 215, pl. I, fig. 6.
- 1861. *Polycentropus bimaculatus* Hagen, Ent. Annual : 3.
- 1864. *Neureclipsis bimaculata* McLachlan, Ent. Mon. Mag., 1 : 31.
- 1864. *Neureclipsis bimaculata* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 851.
- 1865. *Neureclipsis bimaculata* McLachlan, Trich. Brit. : 152, pl. 8, fig. 5, pl. 14, fig. 6.
- 1878. *Neureclipsis bimaculata* McLachlan, Rev. and Syn. : 392, pl. 42 (complete early bibliography given).

1907. *Neureclipsis bimaculata* Ulmer, Genera Insect., fasc. 60a : 181, pl. 24, fig. 222.
 1910. *Neureclipsis bimaculata* Martynov, Ann. Mus. Zool. Acad. Imper. Sci., St. Petersburg, 15 : 349, 402.
 1934. *Neureclipsis bimaculata* Martynov, Trichoptera Annulipalpia : 233, fig. 167.
 1934. *Neureclipsis bimaculata* Betten, N.Y. State Mus. Bull., 292 : 211.
 1936. *Neureclipsis bimaculata* Milne, St. N. Amer. Trich., 3 : 88.

Walker's description of *Anticyra ? robusta* :

"*Picea, fulvo-hirta, subtus ferruginea ; antennis, palpis, pedibusque testaceis ; alae anticae subfuscae maculis duabus discalibus e pilis congestis flavis, posticae subcinereae.*

"Pitchy, clothed with tawny hairs, ferruginous beneath : antennae testaceous, stout, almost as long as the body : palpi and legs testaceous : fore-wings slightly

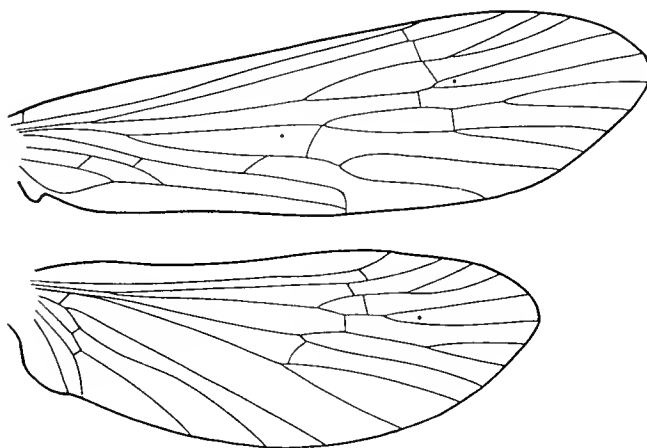


FIG. 107.—*Neureclipsis bimaculata* Walk. : wings.

brown, with two spots on the disk composed of pale yellow hairs : hind-wings pale gray. Length of the body 2 lines ; of the wings 6 lines.

"a. England.

"This species probably belongs to a genus not yet described."

To this we add :

Head above, face, and tegulae, all covered with dense, long, tawny hair ; *antennae* yellowish, the middle of the joints with darker hair ; *palpi* yellow, a little darker than the antennae ; *thorax* dark reddish brown above ; *legs* yellow ; *fore wings* brown, with blackish and with some yellow hair ; an indistinct spot of yellow hair in the middle of the wing and another that extends from the cross-vein of the sector to the costal margin ; *hind wings* transparent brownish, the black pubescence somewhat more dense along the anterior margin and the apex than elsewhere ; the specimen is without abdomen.

Length of the fore wing, 6 mm.

There is a single type-specimen.

Dipseudopsis capensis Walker.

(Fig. 108.)

1852. *Dipseudopsis capensis* Walker, Cat. Neur. Brit. Mus. : 91.
 1864. *Dipseudopsis capensis* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 811.
 1875. *Dipseudopsis capensis* McLachlan, Tijdschr. v. Ent., 18 : 17, pl. 2, fig. 12.
 1875. *Dipseudopsis fasciata* Brauer, Verh. Zool. Bot. Ges. Wien, 25 : 69, pl. 4, fig. 3.
 1897. *Dipseudopsis centralis* Kolbe, Deutsch.-Ost.-Afr., 4, Netzfl. : 41.
 1905. *Dipseudopsis fasciata* Ulmer, Ann. k. k. Natur. Hofmus. Wien, 20 : 95, fig. 72.
 1907. *Dipseudopsis capensis* Ulmer, Genera Insect., fasc. 60a : 188.
 1907. *Dipseudopsis centralis* Ulmer, Genera Insect., fasc. 60a : 188.
 1907. *Dipseudopsis fasciata* Ulmer, Genera Insect., fasc. 60a : 188, pl. 24, fig. 230e.
 1908. *Dipseudopsis fasciata* Ulmer, Wiss. Ergebn. Schwed. Zool. Exped. Kilimandjaro Meru., Trichoptera : 10 (reduces *centralis* to synonymy).
 1912. *Dipseudopsis fasciata* Ulmer, Deutsch.-Zentralaf.-Exped., 4 : 86, 87, fig. 9a, b.
 1919. *Dipseudopsis fasciata* Lestage, Rev. Zool. Afr., 6 : 277, 281, 330.
 1929. *Dipseudopsis capensis* Ulmer, Deutsch. Ent. Zeitschr., 1929 : 192, fig. 31 (reduces *D. fasciata* to synonymy).
 1930. *Dipseudopsis capensis* Navás, Rev. Zool. Bot. Afr., 19 : 323.
 1931. *Dipseudopsis capensis* Navás, Rev. Zool. Bot. Afr., 20 : 274.
 1931. *Dipseudopsis capensis* Navás, Rev. Zool. Bot. Afr., 21 : 138.
 1932. *Dipseudopsis capensis* Navás, Rev. Zool. Bot. Afr., 22 : 288.
 1932. *Dipseudopsis fasciata* Mosely, Mem. Est. Mus. Zool. Univ. Coimbra, ser. 1, no. 64 : 6.
 1934. *Dipseudopsis capensis* Barnard, Trans. R. Soc. S. Afr., 21 : 374-376, fig. 43.

Walker describes the species as follows :

"*Picea* ; *antennis palpisque ferrugineis* ; *pedibus fulvis* ; *alae anticae fuscae aureo-pubescentes, posticae cinereae*."

"Pitchy, slightly tinged with gray : antennae and palpi ferruginous : legs tawny : fore-wings brown, thinly clothed with gilded down : hind-wings gray ; veins testaceous. Length of the body $3\frac{1}{2}$ lines ; of the wings 10 lines."

"*a*. Port Natal. From M. Gueinzus' collection."

We add :

Head black above, face and palpi dark brown ; basal joint of the *antennae* (but one joint remains) dark brown ; of the maxillary palpi, the 2nd, 3rd and 4th joints are wide and flat, the 3rd is largest, the 2nd and the 4th about equal in length, the 2nd wider than the 4th, the 5th cylindrical ; prothorax yellow, the remainder of the thorax dark brown ; *fore legs* brownish, *hind legs* a little lighter in colour, the middle pair wanting ; *wings* brown throughout with but a few scattering scale-hairs remaining near the base of the wings—the "gilded down" of the original description.

Length of the fore wing, 12 mm.

Genitalia, male.—The apical margin of the 9th tergite is strongly produced ; superior appendages very large, oval ; upper penis-cover large, hood-shaped, lower apical angle turned under and inward, apex excised ; penis short and stout, apex dilated with the apical margin truncate ; inferior appendages somewhat concave ; from the side, with a circular excision of the lower margin ;

from beneath, the appendages are elbowed widely with the apices strongly dilated.

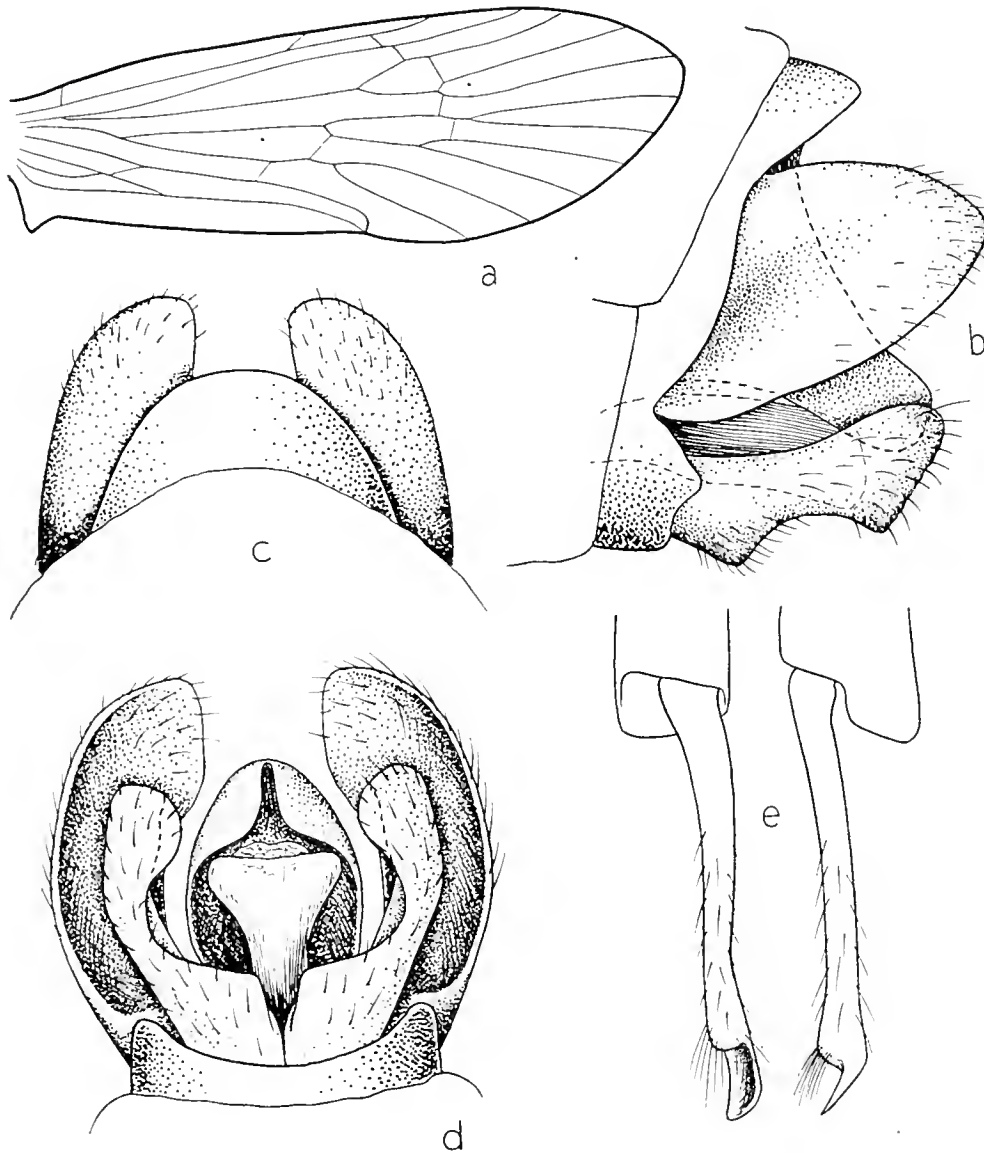


FIG. 108.—*Dipseudopsis capensis* Walk. ♂: *a*, fore wing; *b*, genitalia, lateral, *c*, dorsal *d*, ventral (upper part of the 9th tergite omitted); *e*, two aspects of the specialized spur of the hind leg.

There is a single type-specimen, a male. Ulmer (1929) is correct in his observation that the abnormal spur of the hind leg has but one hook, and that matted hairs may sometimes give the appearance of a second one.

CALAMOCERATIDAE.

Ganonema vicarium (Walker).

(Fig. 109.)

1852. *Hydropsyche vicaria* Walker, Cat. Neur. Brit. Mus. : 114.
 1864. *Macronema vicarium* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 846.
 1871. *Ganonema vicarium* McLachlan, Journ. Linn. Soc. Zool., 11 : 126, pl. 3, fig. 11.
 1907. *Ganonema vicarium* Ulmer, Genera Insect., fasc. 60a : 16.
 1912. *Ganonema vicarium* Martynov, Ann. Mus. Zool. Acad. Imp. Sci., St. Petersburg, 17 : 7-9, figs. 5-8.
 1913. *Ganonema vicarium* Ulmer, Deutsch. Ent. Zeitschr., 1913 : 398.

Walker's description :

"*Ferruginea ; corpore subtus pedibusque testaceis ; antennae testaceae nigro-hirtae ; alae anticae fulvae fusco conspersae macula parva rotunda discali flavescente.*

"Ferruginous, clothed with pale hairs, testaceous beneath : antennae testaceous, partly clothed with black hairs : legs testaceous : fore-wings hairy, tawny, with numerous brown marks, which are most prevalent towards the tips, and with a small round pale yellowish spot in the disk before the middle ; hind-wings gray. Length of the body $3\frac{1}{2}$ lines ; of the wings 12 lines.

"*a. Venezuela. From Mr. Dyson's collection.*"

We add :

Head dark brown above, on the median line a wart, broader than long, with two long black hairs and a few short grey hairs ; immediately back of this wart, a broad band of black hair extends toward the rear margin of the head ; near the margin of each eye there is a round wart with a few long black hairs ; still farther back, there is on each side a triangular wart with the base of the triangle at the eye margin and the apex near the median line, these warts each with two long black hairs and a number of short gray ones along the anterior margin ; the median band of hair appears dark or pale, depending on the incidence of the light ; the eyes are margined anteriorly with long black hair ; *antennae* with the basal joint pale, the next joint brown, the remainder of the right and all of the left antenna wanting ; maxillary palpi pale, covered with mostly black and some yellow hair ; labial palpi yellow ; pronotum light brown, with one median and two lateral warts covered with black hair ; mesonotum (largely destroyed by the pin) dark brown on the sides, the middle lighter in colour and apparently hairy, metanotum light brown in the middle, darker at the anterior angles ; *legs* yellow, the tibiae and tarsi a little darker ; there is a close cover of yellow scale-hairs, and on the hind femora there are many long, yellow hairs ; *fore wings* brown, covered with golden pubescence and some longer, whitish hairs ; the golden pubescence is for the most part distributed in small dots ; in the posterior half of the basal third of the wing there is a brown patch with a golden spot in its centre ; the largest patch of golden hair is along the base of the first anal vein and at the tips of the anals is an indistinct white spot ; the apical fringe is rather long, with alternate patches of dark and pale hair ; *hind wings* light brown, the basal lobe brown in

colour, and margined very heavily with long, brown hair; fork no. 5 with a broad, truncate base; *abdomen* brownish above except that the 1st segment is whitish and the 2nd yellow; beneath and along the sides the abdomen is pale yellow.

Length of the fore wing, 12 mm.

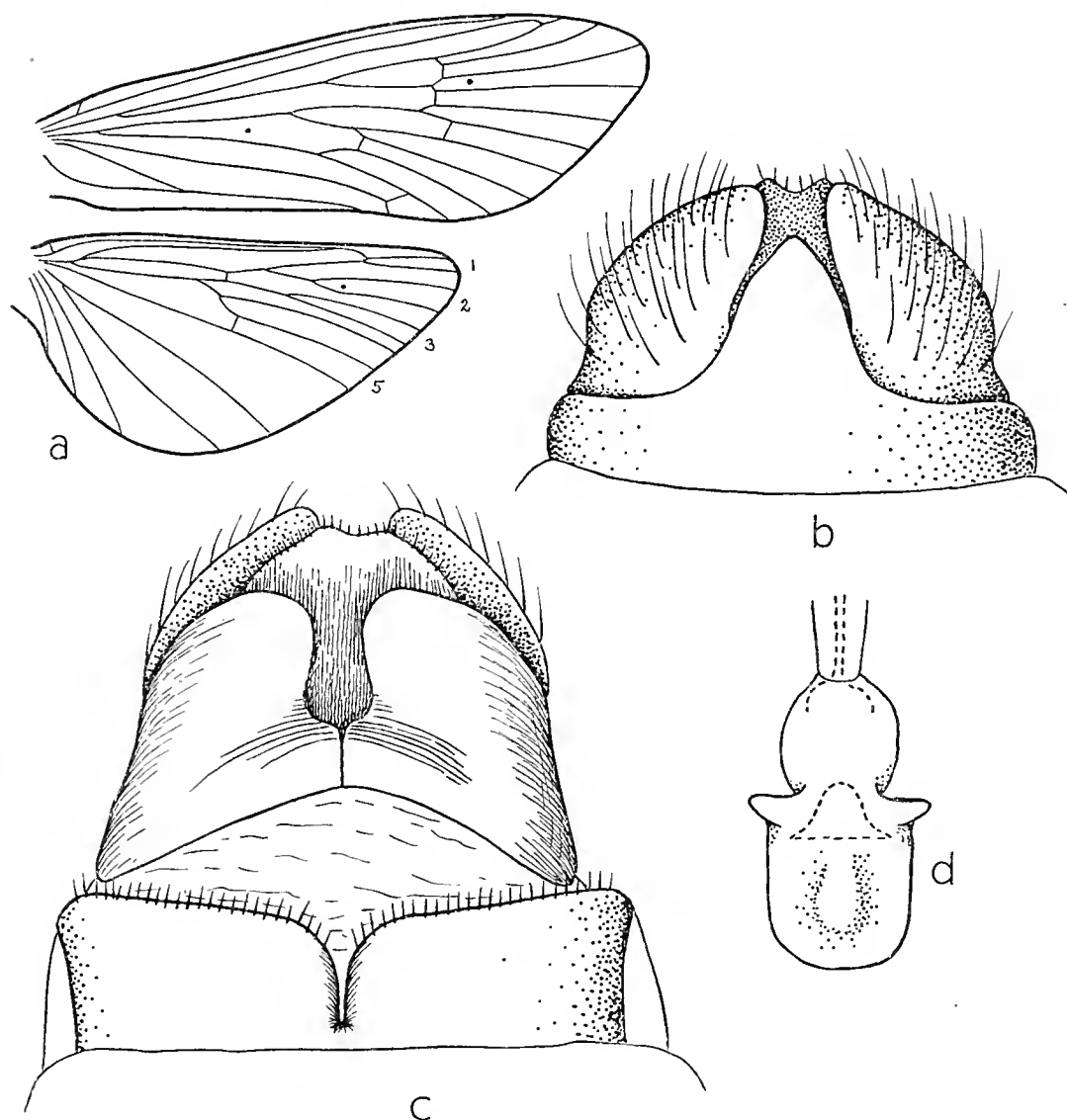


FIG. 109.—*Ganonema vicarium* Walk. ♀: *a*, wings; *b*, apex of the abdomen, dorsal, *c*, ventral; *d*, internal structure of the vagina.

Genitalia, female.—Apical margin of the terminal tergite produced at its centre in a triangular tongue, on each side of which is an oval plate inclining inwards; there is a large plate below this, and then two large lobes, each with a small projection on its inner margin near the base; below these is a pair of quadrangular plates separated from each other by a narrow excision.

The single type-specimen is a female.

Ascalaphomerus humeralis Walker.

(Fig. 110.)

1852. *Ascalaphomerus humeralis* Walker, Cat. Neur. Brit. Mus. : 80.
 1864. *Ascalaphomerus humeralis* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 806.
 1871. *Ascalaphomerus humeralis* McLachlan, Journ. Linn. Soc. London, Zool., **11** : 122.
 1907. *Ascalaphomerus humeralis* Ulmer, Genera Insect., fasc. **60a** : 117.

Walker's description :

"*Niger, hirtus ; antennae corpore duplo longiores ; thoracis latera antica rufo-hirta.*

"Black, thickly clothed with black hairs : eyes red : antennae full twice the length of the body, hairy at the base : thorax with a tuft of bright red hairs on each shoulder : legs hairy ; posterior thighs and tibiae partly clothed with hoary hairs : wings blackish ; fore-wings thinly covered with black down, slightly angular on the hind border, semifusiform towards the tips ; veins black. Length of the body 6 lines ; of the wings 22 lines.

"*a. Northern China. From Mr. Fortune's collection.*"

To this we add :

Head black above, eyes copper coloured, their inner margins oblique ; there are several warts covered with stiff, orange-coloured hair, one on the median line, the hairs reaching to the bases of the antennae, two very large ones at the rear margin ; between these and the anterior wart another pair, intermediate in size, and still another pair on the posterior margin, back of the eyes ; face black, the eyes bordered internally with black hair ; *antennae* dark brown, broadly curved at the tip, each joint with a narrow, pale spot beneath ; palpi densely covered with dark brown hair ; pronotum black ; on each side above are two warts covered with stiff, orange hair ; mesonotum and metanotum black above, the mesonotum with a broad median stripe divided into areas which appear silvery in some lights ; the middle area has a patch of dark hair at either side anteriorly, and further back is a pair of narrow warts covered with black hair ; tegulae covered with orange hair ; *thorax* beneath, the *legs*, and *abdomen* dark brown ; *wings* brown, with short, black pubescence, the veins darker brown ; in the *fore wing* the conjoined 1st A and 2nd A is not continued to meet 3rd A, but ends abruptly ; in cell 1st A, a little before the middle of the wing, there is a line of black hairs arising from small round sockets ; a similar, longer area of these hairs is between 3rd A and the posterior margin of the wing ; in the *hind wing* the base of Cu₁ bears a fringe of long, black hair.

Length of the fore wing, 27 mm.

Genitalia, male.—Apical margin of the 9th tergite withdrawn ; it bears two very small, slender and transparent processes, on each side of which is the superior appendage, which is moderately long, stout, with dilated apex ; beneath these is the upper penis-cover, formed of two plates, probably welded together along their inner sides to leave an excised apical margin and forming a hood

over the penis ; the plates appear rather deep from the side and arise from a broad, rectangular base as seen from above ; penis narrow and slightly curved ; lateral angles of the 9th segment produced, their apical margins still further

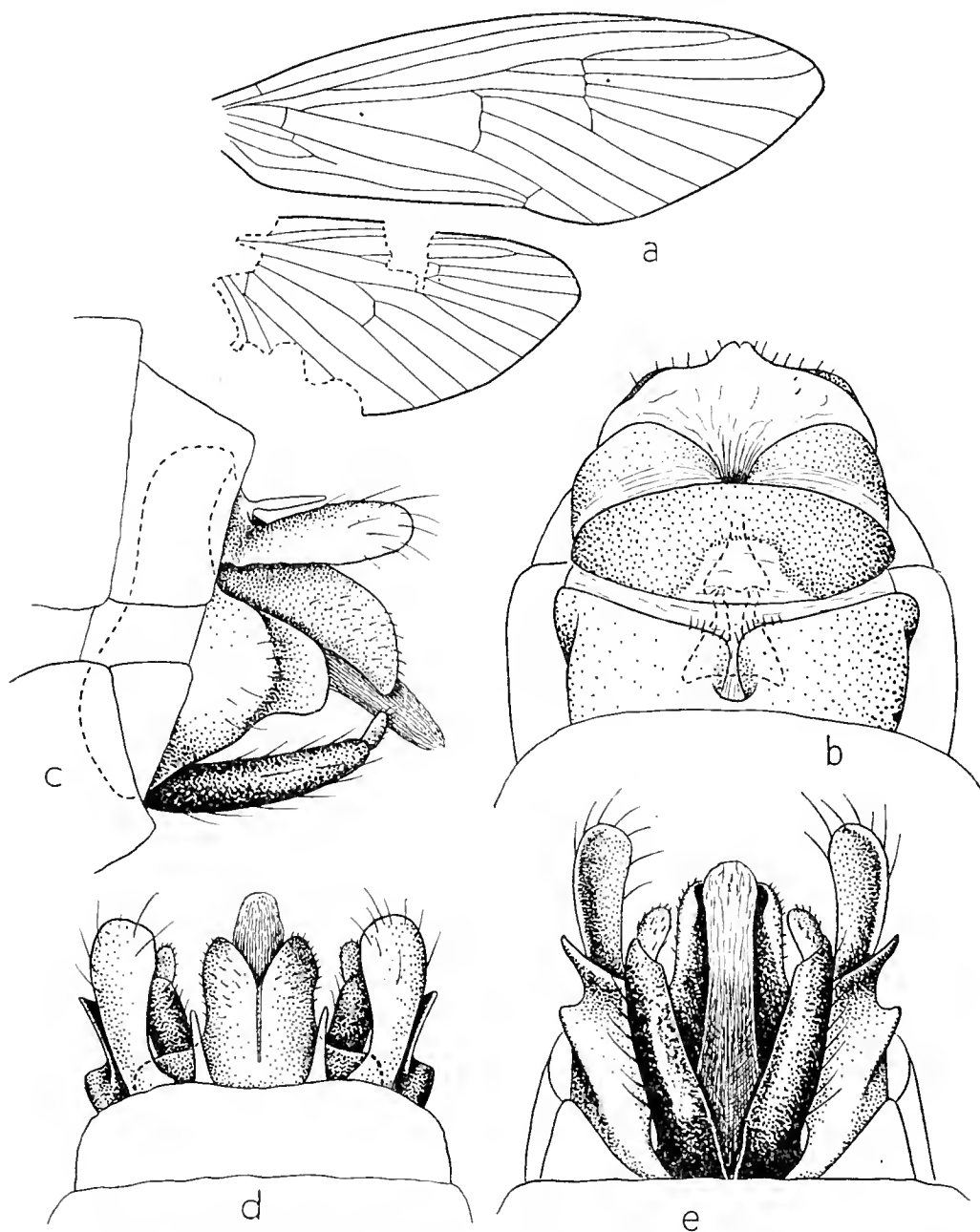


FIG. 110.—*Ascalaphomerus humeralis* Walk.: *a*, wings ♀; *b*, apex of the abdomen ♀, ventral; *c*, genitalia ♂, lateral, *d*, dorsal, *e*, ventral.

produced to make plate-like edges ; inferior appendages two-jointed, rather small, lower joint stout and long, apical joint very small.

Genitalia, female.—Apical margin of the terminal tergite sinuous, slightly excised at its centre ; from beneath, immediately beneath this segment are

two rounded plates; below this again, a wide plate with an unpigmented, triangular area at the centre of its base; below this, two quadrangular plates separated from each other by a narrow cleft. The structures connected with the vagina are shown in the figure but are not here described.

The single type-specimen is a female.

The figures of the male genitalia have been drawn from an example in the McLachlan collection.

ODONTOCERIDAE.

Barypenthus claudens (Walker).

(Fig. 111.)

- 1859. *Barypenthus rufipes* Kolenati *nec* Burm., Gen. et Species Trich., 2 : 287, pl. 4, fig. 48.
- 1860. *Musarna claudens* Walker, Trans. Ent. Soc. London, (2) 5 : 179.
- 1864. *Musarna claudens* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 848 (doubtfully identified with *rufipes*).
- 1866. *Musarna claudens* McLachlan, Trans. Ent. Soc. London, (3) 5 : 276 (identified with *B. rufipes* as determined by Kolenati, pl. 8, fig. 2).
- 1905. *Barypenthus claudens* Ulmer, Stett. Ent. Zeit., 66 : 20.
- 1905. *Barypenthus claudens* Ulmer, Ann. k. k. Naturh. Hofmus. Wien, 20 : 70.
- 1907. *Barypenthus claudens* Ulmer, Genera Insect., fasc. 60a : 124.
- 1913. *Barypenthus claudens* Ulmer, Deutsch. Ent. Zeitschr., 1913 : 399.

Walker's description :

"*Foem.*—*Nigricans*, *subtus fulva*, *antennis fuscis*, *fulvo-annulatis*, *alis anticis ferrugineo-fuscis latis vix longis*, *fasciis duabus incompletis e strigis auratis*, *posticis nigricante cinereis*.

"*Female.*—Blackish, tawny beneath : antennae brown, with tawny wings, as long as the body ; fore-wings ferruginous brown, broad, hardly long, more convex along the costa than in the preceding species (*interclusa*), moderately oblique along the exterior border with two slight incomplete bands, composed of short gilded streaks, the one exterior, the other sub-apical ; hind-wings blackish-cinereous.

"Length of the body 7 lines ; of the wings 22 lines.

"Brazil."

To this we add :

Head dark brown above, with dark brown hair on the warts ; face brown, with splotches of white ; ocelli wanting ; *antennae* brownish yellow, with black hair above, more yellowish beneath, basal joint nearly as long as the head ; the next succeeding joints are broader distally than at base, each joint overlapping the base of the next somewhat ; palpi brown, with yellow and blackish hair ; maxillary palpi three-jointed, with second joint longest, the third a little longer than the first ; *thorax* dark brown above, the warts of the pronotum, and the tegulae with a heavy covering of dark hair ; *legs* yellow, covered with mostly golden hair, some black hair on the tibiae of all the legs and on the anterior tarsi ; arrangement of spurs uncertain ; *fore wings* dark reddish brown, with a series

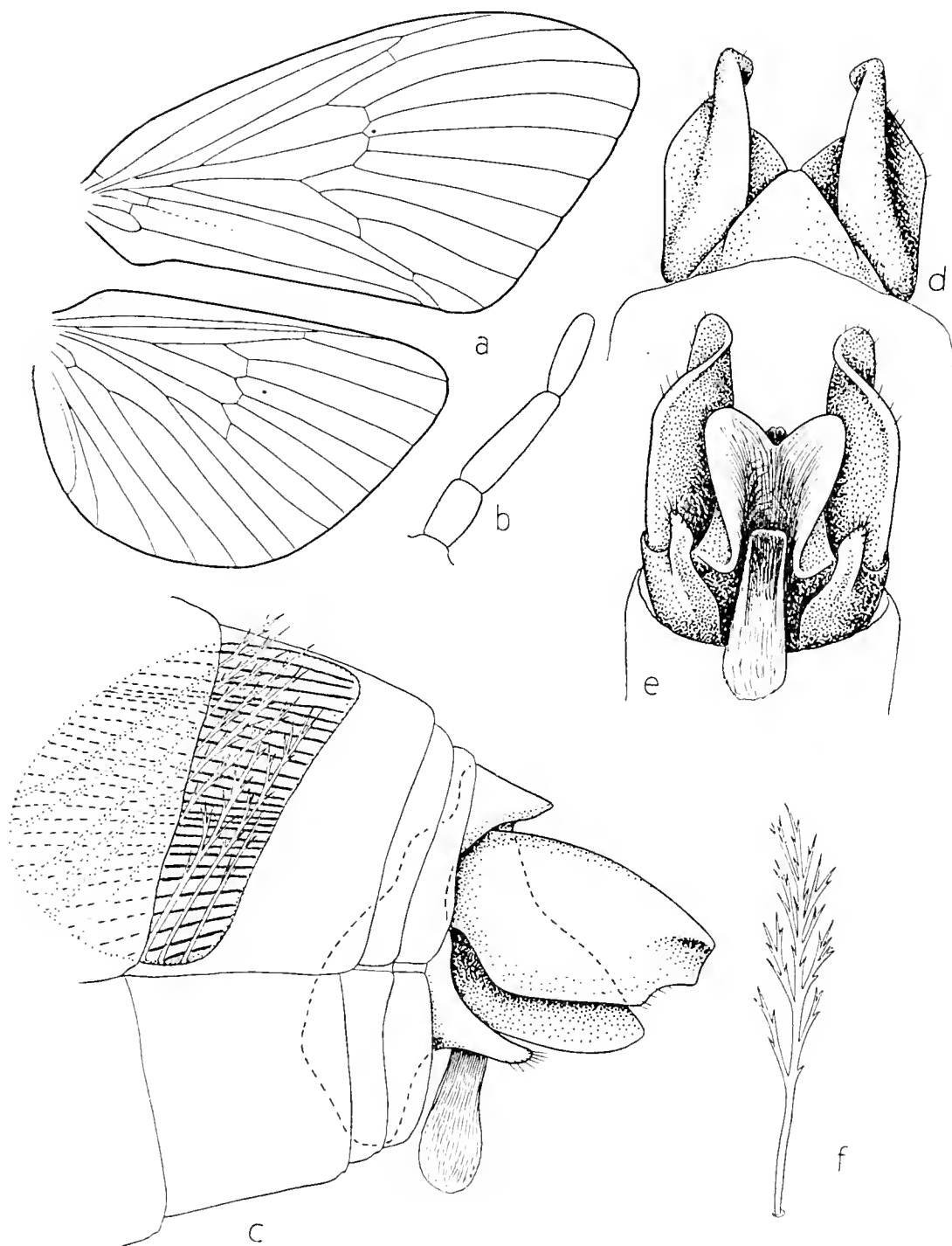


FIG. 111.—*Barypenthus claudens* Walk. ♂: *a*, wings; *b*, maxillary palpus; *c*, genitalia, lateral, *d*, dorsal, *e*, ventral; *f*, specialized hair from the lateral structure.

of yellow spots on R_2 , R_3 , R_4 , R_5 , and M_1 in a slightly curved line before the apex ; a few very small yellow flecks near the apical margin ; *hind wings* also dark brown but duller than the fore wings, a few small flecks of yellow at the apex ; *abdomen* above, pale at base and brown posteriorly, pale beneath.

Length of the fore wing, 22 mm. ; greatest width, 12 mm.

Genitalia, male.—From above, the apical margin of the 9th tergite is produced in an acute triangle ; on each side are large superior appendages, very deep from the side, lower margins forming narrow, outturned shelves ; the lateral margin of the 9th segment is seen, from the side, to be produced in an acute sidepiece ; upper penis-cover large, deeply excised at its apical margin, forming a hood over the penis which is directed straight downward with a dilated apex ; the 5th segment, on each side, bears a scent-organ (?) in the form of a somewhat semi-circular plate, strongly striated horizontally along the length of the abdomen, and bearing feathered hairs arising from the lower margin and stretching upwards across the striations.

Ulmer (1905 : 70) indicated that Kolenati's description was from specimens of *B. claudens* and not, as he thought, of *B. rufipes*.

The single type-specimen is a male. Walker, in his description of *Musarna*, stated that he had before him both sexes of the genus. The male is represented by *claudens*, and the statement in the specific description that *claudens* is a female is evidently a *lapsus calami*. McLachlan (1866 : 276) is equally mistaken in saying that "the single type of each of the three species is a male and not a female as described".

There has been uncertainty also as to the number of joints in the palpi in this genus. Burmeister (1839) gives the number as three in the male. Kolenati (1859) indicates four. McLachlan (1866) gives the number as three in *claudens* (male), and four in *concolor* and *interclusus*. Ulmer (1905 : 20) gives three and five for males and females of *rufipes* and four for females of *concolor*, but later (1907 : 122, 124) suggests that the number may be five in both sexes, and that the difficulty lies in the fact that the last joints are not sharply set off and that the pubescence is often heavy. We find the maxillary palpi in the male type of *claudens* to have three joints and in the females of the other species five joints.

We prefer, at present, not to express a definite judgment on the systematic position of the genus *Barypenthus*. The structure of the male genitalia and the fact that the palpi are three-jointed in the male suggest that McLachlan may have been right in his earlier opinion that the genus belongs in the Sericostomatidae. There are certainly some resemblances to *Brachycentrus*. The shape of the wings and the reduced condition of the anal veins of the fore wing point rather to the Calamoceratidae or the Odontoceridae. The reduced venation of the male of *Barypenthus* is paralleled in both the other groups. Doubtless *Barypenthus* would appear aberrant in almost any relationship.

Barypenthus concolor Burmeister.

(Fig. 112.)

1839. *Barypenthus concolor* Burmeister, Handb. Ent. : 929.
 1852. *Barypenthus concolor* Walker, Cat. Neur. Brit. Mus. : 54.
 1860. *Musarna aperiens* Walker, Trans. Ent. Soc. London, (2) 5 : 178.
 1864. *Barypenthus concolor* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 806.
 1864. *Musarna aperiens* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 848 (doubtfully referred to *B. concolor*).
 1866. *Musarna aperiens* McLachlan, Trans. Ent. Soc. London, (3) 5 : 276, 277, pl. 18, fig. 3 (listed as probably a synonym of *concolor*).
 1905. *Musarna concolor* Ulmer, Stett. Ent. Zeit., 66 : 22, pl. 1, figs. 19 (confirms the judgment that *aperiens* is a synonym).
 1907. *Barypenthus concolor* Ulmer, Genera Insect., fasc. 60a : 124, pl. 17, fig. 153a, b, pl. 36, fig. 4.
 1913. *Barypenthus concolor* Ulmer, Deutsch. Ent. Zeitschr., 1913 : 400.

Walker's description of *Musarna aperiens* :

"*Foem.*—*Nigricans, subtus lurida, antennis basi luridis corpore paullo longioribus, alis longis latiusculis fusescente cinereis, posticis subpallioribus.*

"*Female.*—Blackish, lurid beneath : antennae lurid towards the base, a little longer than the body ; wings long, rather broad, dark brownish-grey ; fore-wings convex along the costa, very oblique along the exterior border ; hind-wings a little paler and less tinged with brown than the fore-wings.

"Length of the body 8 lines ; of the wings 30 lines.

"South America."

To this we add :

Head dark brown above, a wart behind each antenna, and the posterior warts very dark brown and covered with black hair ; ocelli wanting ; *antennae* yellowish, set close together, the basal joint nearly as long as the head, covered with black hair, the succeeding joints slender ; a small point of each overlaps the next succeeding joint ; as seen from above the basal joint appears convex medially and concave on the outside ; palpi yellow, with black hair, particularly on the 3rd joint, the 2nd joint longest, the 3rd, 4th and 5th successively shorter, the division between the 4th and 5th not clearly shown ; *thorax* (somewhat damaged) dark brown to black above, two transverse warts on the prothorax and two longitudinal warts on the mesothorax anteriorly and two posteriorly, all covered with brown hair ; *legs* yellow, the tibiae and tarsi covered with black hair, a long, brown patch on the coxa of each leg ; spurs 1-2-2 ; *fore* and *hind wings* brown throughout, covered with short, black hair ; in the right fore wing (but not in the left) a cross-vein is present setting off the median cell ; in the left wing (but not in the right) a minute cross-vein joins the subcosta to the costa ; the venation of the hind wing is similar to that of *B. interclusus* (Fig. 113) ; *abdomen* brown in the anterior portion, darker brown posteriorly, the last segment and the ventral segments lighter brown.

Length of the fore wing, 31 mm.

Genitalia, female.—Terminal (?) dorsal segment produced in an acute triangle; beyond it are two large oval plates connected by a membrane; these plates form a hood covering a large cavity in which is seen another hood-like structure with inturned lateral margins.

There is a single type-specimen, a female.

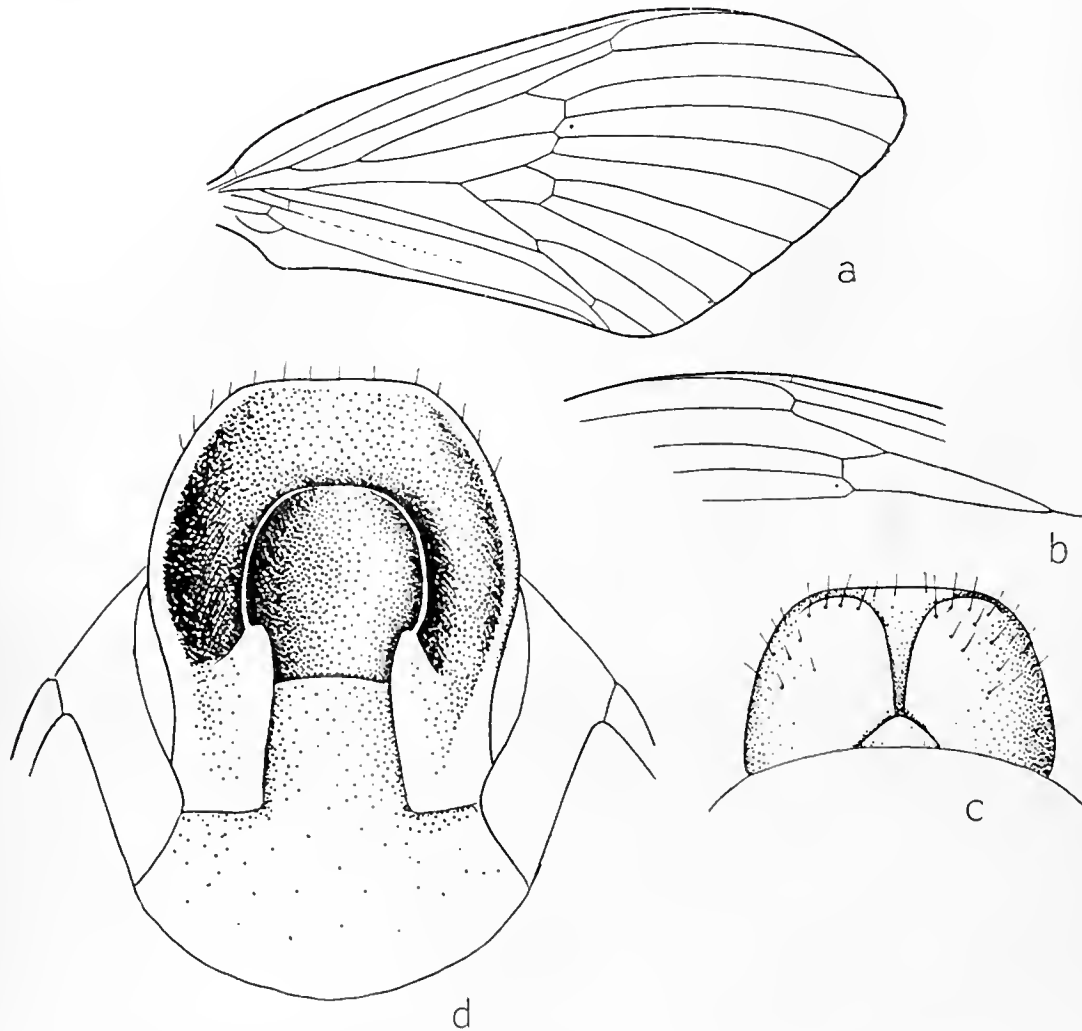


FIG. 112.—*Barypenthus concolor* Burm. ♀: *a*, right fore wing, *b*, anterior apical portion of the left fore wing; *c*, apex of the abdomen, dorsal, *d*, ventral.

***Barypenthus interclusus* (Walker).**

(Fig. 113.)

- 1860. *Musarna interclusa* Walker, Trans. Ent. Soc. London, (2) 5 : 178, 179.
- 1864. *Musarna interclusa* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 848 (listed as a synonym of *concolor*).
- 1866. *Musarna interclusa* McLachlan, Trans. Ent. Soc. London, (3) 5 : 276, 277.
- 1905. *Musarna interclusa* Ulmer, Stett. Ent. Zeit., 66 : 23.
- 1907. *Barypenthus interclusus* Ulmer, Genera Insect., fasc. 60a : 124.

Walker's description :

"*Foem.*—*Atra*, *antennis corpore paullo brevioribus*, *alis anticis nigris longis latiusculis apud medium obscure cinereis*, *posticis nigricante cinereis*.

"*Female.*—Deep black: antennae a little shorter than the body; fore-wings black, long, rather broad, more convex along the costa than in the preceding species (*claudens*), very oblique along the exterior border; middle part, except along the costa, dark cinereous; hind-wings blackish-cinereous.

"Length of the body 8 lines; of the wings 26 lines.

"Brazil."

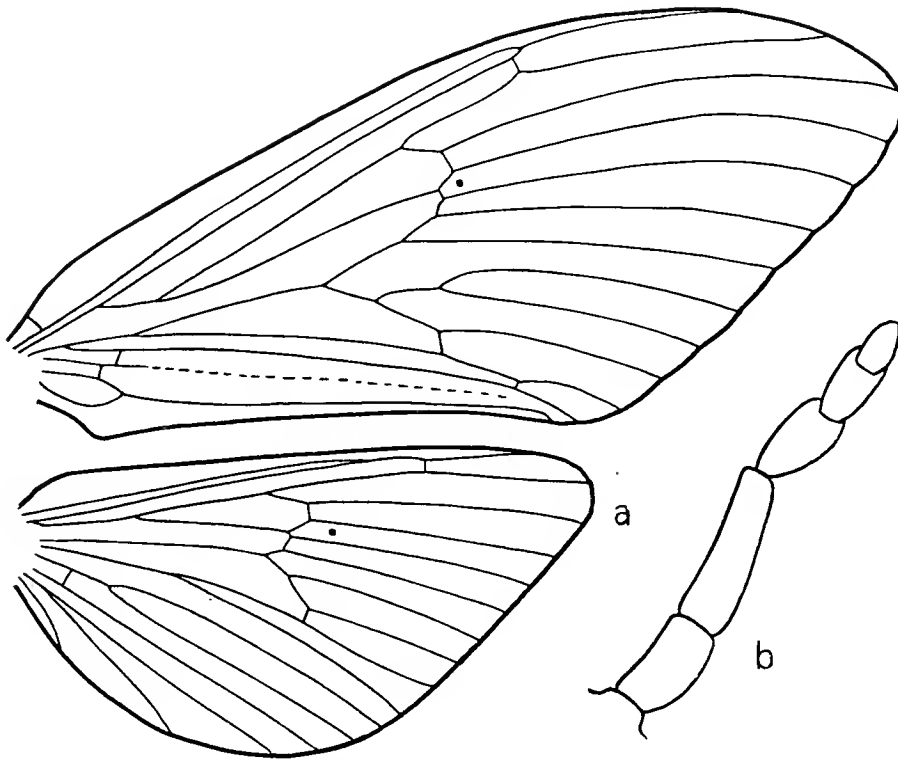


FIG. 113.—*Barypenthus interclusus* Walk. ♀: *a*, wings; *b*, maxillary palpus.

We add :

Head black above, two anterior and two posterior warts covered with black hair; ocelli wanting; *antennae* black, the basal joint not quite as long as the head, convex internally and concave externally. 2nd, 3rd and 4th joints short, the others long; maxillary palpus five-jointed, basal joint rather short, about half the length of the 2nd, 3rd as long as the 1st, 4th a little shorter than the 3rd, 5th the shortest, very small; *thorax* black above, the mesonotum with two anterior oval warts and two posterior round warts covered with brown hair; thorax beneath, and the *legs* dark reddish brown; spurs uncertain; *fore wings* dark reddish brown, bordering on purple, the basal half somewhat transparent, possibly because denuded; numerous small transparent spots

in the apical half of the wing; *hind wings* transparent brownish at base, the apex covered with brown hair; *abdomen* deep brown to black throughout.

Length of the fore wing, 30 mm.

There is a single type-specimen, a female.

LEPTOCERIDAE.

Triplectides cephalotes (Walker).

(Fig. 114.)

1852. *Leptocerus cephalotes* Walker, Cat. Neur. Brit. Mus. : 73.
 1864. *Leptocerus cephalotes* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 828.
 1866. *Notanatomica cephalotes* McLachlan, Trans. Ent. Soc. London, (3) 5 : 257.
 1868. *Notanatomica cephalotes* McLachlan, Journ. Linn. Soc. Zool., 10 : 212.

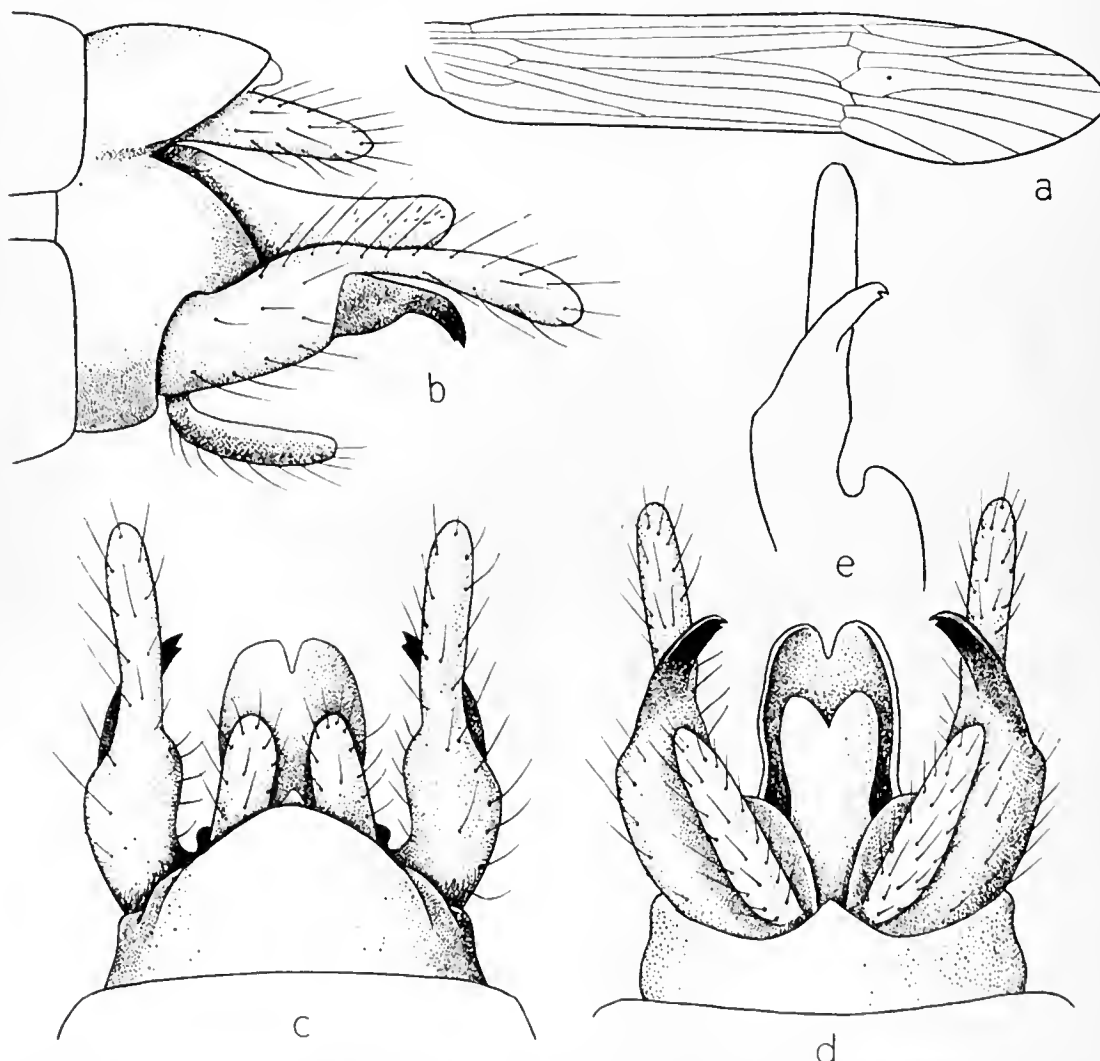


FIG. 114.—*Triplectides cephalotes* Walk. ♂: *a*, fore wing; *b*, genitalia, lateral, *c*, dorsal, *d*, ventral; *e*, inferior appendage, from beneath.

1900. *Notanatomica cephalotes* Hutton, Trans. N.Z. Inst., **31** : 242.
 1904. *Notanatomica cephalotus* Hudson, N.Z. Neuroptera : 77.
 1906. *Notanatomica cephalotes* Ulmer, Notes Leyden Mus., **28** : 34.
 1907. *Notanatomica cephalotes* Ulmer, Genera Insect., fasc. **60a** : 130.
 1936. *Triplectides cephalotes* Mosely, Trans. R. Ent. Soc. London, **85** : 91, 104, figs. 38-42.

Walker describes the species as follows :

"*Ferrugineus, subtus testaceus ; caput latum ; antennae testaceae, nigro annulatae ; pedes testacei ; alae subhyalinae, venis testaceis.*

"Ferruginous, testaceous beneath : head broader than the thorax : palpi slightly hairy : antennae testaceous, more than four times the length of the body, with a black ring on each joint : thorax with three brownish stripes : legs testaceous : wings subhyaline ; veins testaceous. Length of the body $3\frac{1}{4}$ lines ; of the wings 14 lines.

"*a.* New Zealand. Presented by Dr. Sinclair.

"The wings of the specimen described are much rubbed."

To this we add that the spurs are 2-2-2, and the male genitalia as follows :

Genitalia, male.—The genitalia very closely resemble those of *T. magna* ; the margin of the terminal dorsal segment is more produced and the superior appendages are broader and shorter.

The type is a male from New Zealand.

Triplectides magna (Walker).

(Figs. 115-117.)

1852. *Leptocerus magnus* Walker, Cat. Neur. Brit. Mus. : 73.
 1862. *Leptocerus cognatus* McLachlan, Trans. Ent. Soc. London, (3) **1** : 306.
 1862. *Leptocerus canescens* McLachlan, Trans. Ent. Soc. London, (3) **1** : 306-307.
 1862. *Leptocerus magnus* McLachlan, Trans. Ent. Soc. London, (3) **1** : 307.
 1864. *Leptocerus canescens* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 828.
 1864. *Leptocerus cognatus* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 828.
 1864. *Leptocerus magnus* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 829.
 1866. *Notanatomica magna* McLachlan, Trans. Ent. Soc. London, (3) **5** : 257, pl. 19, figs. 3a-e (*canescens* reduced to synonymy).
 1866. *Notanatomica cognata* McLachlan, Trans. Ent. Soc. London, (3) **5** : 257.
 1868. *Notanatomica cognata* McLachlan, Journ. Linn. Soc. London, Zool., **10** : 212, pl. 2, fig. 6.
 1868. *Notanatomica magna* McLachlan, Journ. Linn. Soc. London, Zool., **10** : 212.
 1899. *Notanatomica cognata* Hutton, Trans. N.Z. Inst., **31** : 241.
 1904. *Notanatomica cognata* Hudson, N.Z. Neuroptera : 77.
 1905. *Notanatomica cognata* Ulmer, Ann. k. k. Naturh. Hofmus. Wien : **20** : 71.
 1906. *Notanatomica magna* Ulmer, Notes Leyden Mus., **28** : 32-35 (*cognata* reduced to synonymy).
 1907. *Notanatomica magna* Ulmer, Cat. Coll. Zool. Selys, fasc. **6**, pt. 1 : 41.
 1907. *Notanatomica magna* Ulmer, Genera Insect., fasc. **60a** : 130.
 1908. *Notanatomica magna* Ulmer, Deutsch. Ent. Zeitschr., **1908** : 344.
 1908. *Notanatomica magna* Ulmer, Michaelsen-Hartmeyer Fauna S.W. Austr., (3) **2** : 30.
 1909. *Notanatomica magna* Betten, Rec. Indian Mus., **3** : 239.
 1911. *Notanatomica magna* Ulmer, Deutsch. Ent. Zeitschr., **1911** : 400.
 1913. *Notanatomica magna* Ulmer, Ent. Mitt., **2** : 49.
 1913. *Notanatomica magna* Banks, Proc. Ent. Soc. Washington, **15** : 176.
 1916. *Notanatomica magna* Ulmer, Ark. Zool., **10** (13) : 18.

1916. *Notanatolica magna* Banks, Philip. Journ. Sci., 11 : 213.
 1923. *Notanatolica legendrina* Navas, Rec. Ac. Cienc. Zaragossa, 7 : 50.
 1925. *Notanatolica magna* Tillyard, Rec. S. Austr. Mus., 3 : 44.
 1926. *Notanatolica legendrina* Ulmer, Arch. Naturges., 91 (A), 5 : 64.
 1926. *Notanatolica magna* Ulmer, Arch. Naturges., 91 (A), 5 : 64.
 1926. *Notanatolica magna* Tillyard, Ins. Austr. N. Zealand : 393, fig. Y11.
 1930. *Notanatolica magna* Ulmer, Treubia, 11 : 404, 462.

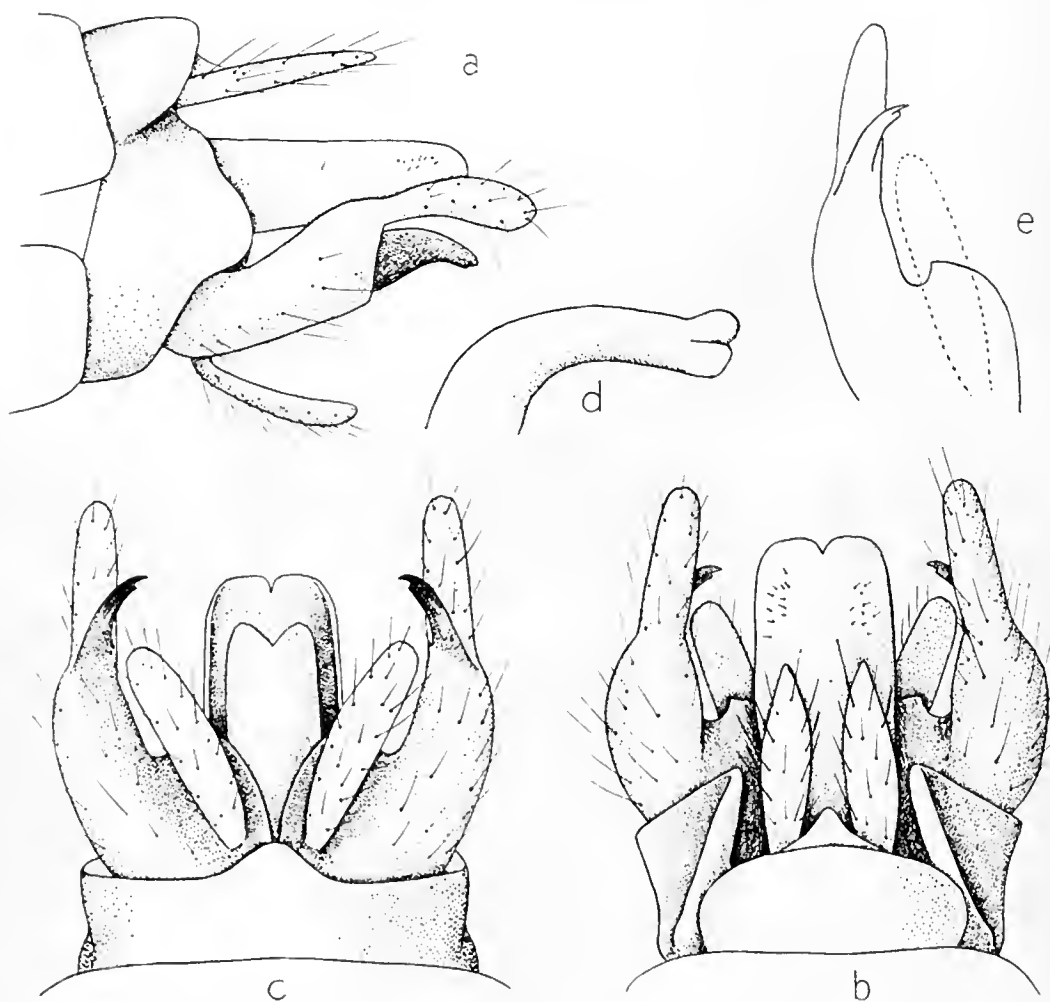


FIG. 115.—*Triplectides magna* Walk. ♂ (from a paratype): *a*, genitalia, lateral, *b*, dorsal, *c*, ventral; *d*, penis; *e*, an inferior appendage, from beneath.

1930. *Notanatolica magna* Martynov, Proc. Zool. Soc. London : 110.
 1930. *Notanatolica legendrina* Martynov, Proc. Zool. Soc. London : 110.
 1932-3. *Notanatolica legendrina* Ulmer, Pekin Nat. Hist. Bull., 7 : 148.
 1932-3. *Notanatolica magna* Ulmer, Pekin Nat. Hist. Bull., 7 : 55, 149.
 1936. *Triplectides magna* Mosely, Trans. R. Ent. Soc. London, 85 : 100-103, figs. 2, 23-35
 (*legendrina* reduced to synonymy).
 1936. *Notanatolica magna* Martynov, Rec. Indian Mus., 38 : 250, 251, figs. 12a-c.

Walker describes the species as follows :

"*Ferrugineus, cano-hirtus* ; *antennae nigrae, longissimae, articulis apice albis* ; *palpi nigri* ; *pedes testacei* ; *alae anticae cervinae, posticae subcinerea*."

"Ferruginous, clothed with hoary hairs: palpi black, rather hairy: antennae black, more than five times the length of the body, ferruginous at the base; tips of the joints white: abdomen at the base beneath and legs testaceous: fore-wings fawn-colour, with darker veins: hind-wings slightly gray. Length of the body 4-5 lines; of the wings 15-19 lines.

"a-d. Van Dieman's Land. From Dr. Hooker's collection.

"e. Van Dieman's Land. Presented by R. Butler, Esq."

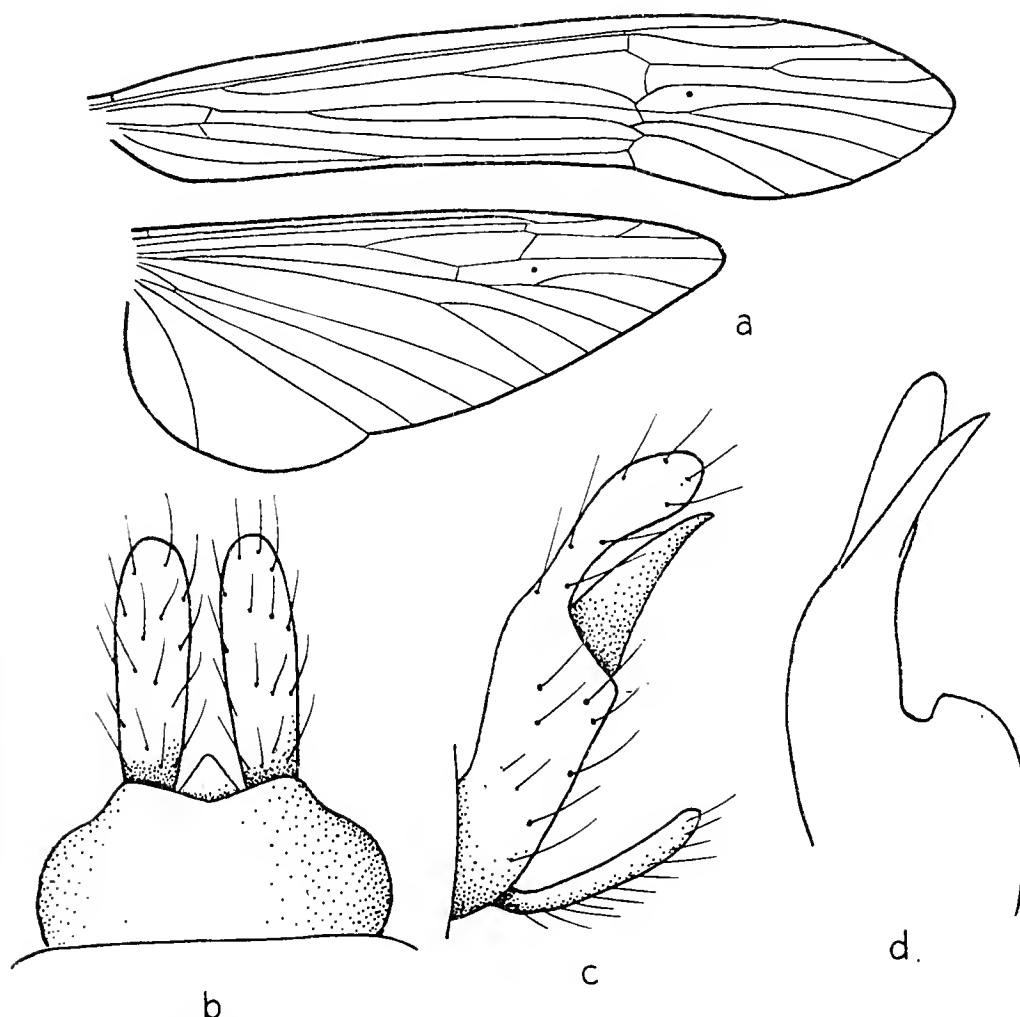


FIG. 116.—*Triplectides magna* Walk. ♂ (from the type): a, wings; b, 9th tergite and superior appendages; c, inferior appendage, lateral, d, ventral.

To this we add that the spur formula is 2-2-2, and the genitalia are described as follows:

Genitalia, male.—Margin of the terminal dorsal segment widely excised with a small, membranous, triangular plate in the centre of the excision; superior appendages fringed with stout hairs, from above, long with rounded apices; upper penis-cover large and rectangular, apical margin truncate with a narrow excision at its centre, lateral margins downwardly bent partly to enclose the penis, which has a deeply excised apex; inferior appendages

three-branched, main branch with a wide, obtuse excision midway along its under surface; at the angle so formed is jointed the 2nd branch, which is short and terminates in an acute apex, directed slightly inwards from above and beneath; this apex is sometimes bifurcate; the main branch tends to become membranous at its apex, where it carries a few, widely scattered hairs; from beneath, the appendages are very stout, and at their bases arise the long, finger-like 3rd branches, lower surfaces fringed with long hairs; at the base of

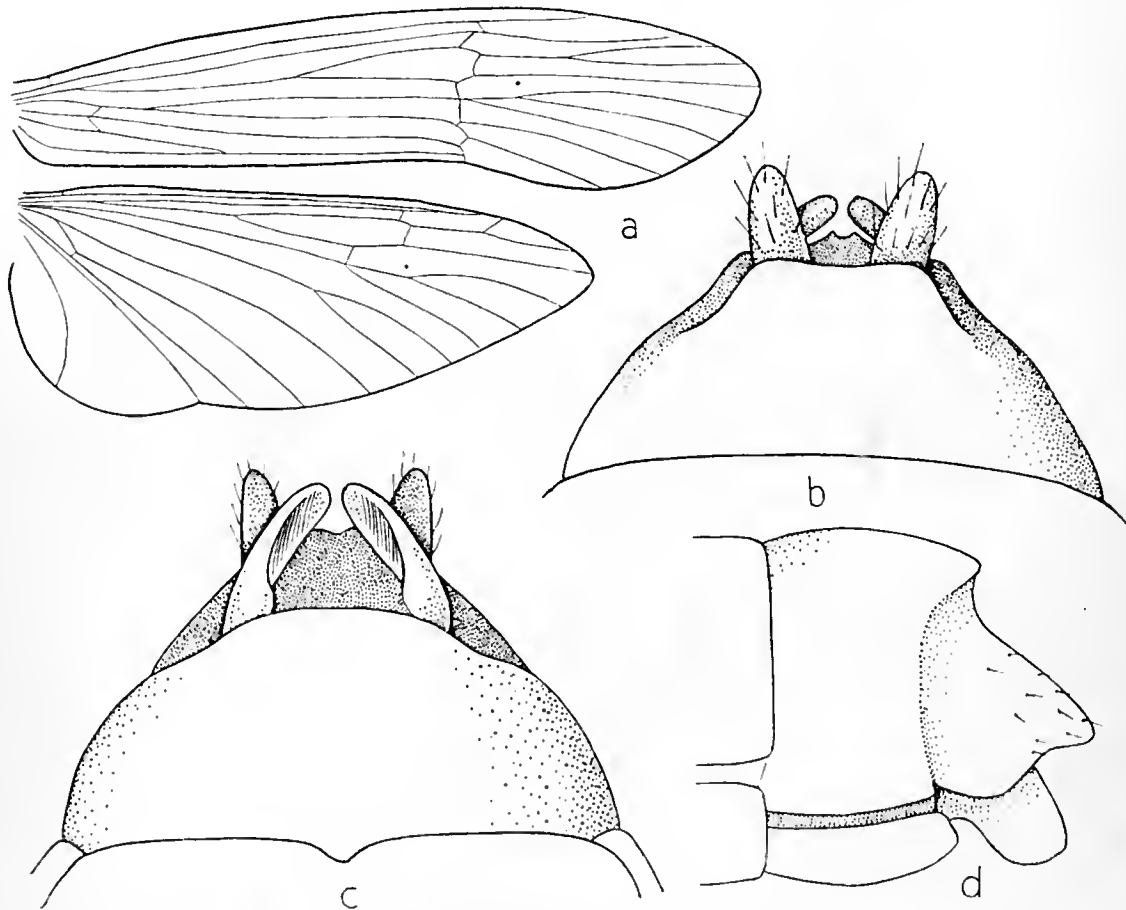


FIG. 117.—*Triplectides magna* Walk. ♀: *a*, wings; *b*, apex of the abdomen, dorsal, *c*, ventral, *d*, lateral.

each appendage, seen from beneath, and inside the 3rd branches, are broad, somewhat hook-shaped plates; the margin of the terminal ventral segment is produced at its centre in a small triangular process.

Genitalia, female.—Terminal dorsal segment somewhat produced at the centre; from above, margin truncate; there are two short, rather broad superior appendages and beneath these a pair of ear-shaped processes, set on edge from above and below, and striated on the inner surfaces; there is a membranous plate between them with an excised apex; margin of the 8th sternite excised at its centre.

The genitalia of the males are somewhat variable, and we figure here those

of a second example (Fig. 115), in which it may be noticed that the superior appendages are more acute at their apices, the margin of the terminal dorsal segment rounded instead of excised, and the 2nd branches of the inferior appendages bifurcate at their apices and perhaps shorter than those of the type.

Walker, in his Catalogue, records five examples, four from Dr. Hooker's collection and one presented by R. Butler. The series, however, would appear to have been somewhat larger, as it now consists of five males bearing the registration label of the Hooker collection as well as the single male presented by Butler, and a female (V. D. L. 44-40 here figured).

The type of the species has already been designated, being the example in the British Museum collection labelled "V. D. L. 48-56", presented by Butler, with the abdomen now mounted in balsam.

The wings and outline drawings of the genitalia of the type are given in Fig. 116; the more elaborate figures of the genitalia given in Fig. 115 are made from a paratype.

The species is widely distributed, the recorded range extending from India to China, Japan, Australia, Tasmania, New Zealand, etc.

Triplectides indica (Walker).

(Fig. 118.)

- 1852. *Leptocerus indicus* Walker, Cat. Neur. Brit. Mus. : 72.
- 1864. *Leptocerus indicus* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 829.
- 1906. *Leptocerus ? indicus* Ulmer, Notes Leyden Mus., 28 : 105.
- 1907. *Leptocerus ? indicus* Ulmer, Genera Insect., fasc. 60a : 136.

Walker's description.

"*Testaceus, albo-hirtus ; antennae articulis albo cinctis ; alae anticae fusco conspersae, posticae albidae.*

"Testaceous, clothed with white hairs : head partly clothed with brownish hairs : joints of the antennae with white bands : fore-wings with minute patches of brown hairs which are most prevalent and partly confluent towards the tips ; veins pale : hind-wings whitish. Length of the body $4\frac{1}{2}$ lines ; of the wings 15 lines.

"*a.* North Bengal. From Miss Campbell's collection."

We add :

Head yellow above, covered with long, whitish hair, in front of each eye a bunch of very long, mostly white and some dark hair ; *antennae* with first joint as long as the head, yellow, covered with white hair ; 2nd joint short, 3rd and 4th (present in one antenna) slender, brownish yellow, narrowly ringed with brown ; maxillary palpi long, covered with dense long whitish and with some dark hair, the basal joint relatively short, the 2nd and 3rd about equal, the 4th and 5th about equal, and each shorter than the 3rd ; the hair somewhat two-ranked as in other Leptoceridae ; mesothorax long, brown above, with a

broad band of white hair on either side of the median line anteriorly ; tegulae covered with white hair ; *fore wings* attached at about the middle of the segment ; metanotum brown at the sides, lighter coloured in the middle ; *fore legs* brownish yellow, some white hair on the femora, *middle legs* (but one present, incomplete) brownish yellow, with white pubescence ; femur of the *hind leg* (tibiae and tarsi lacking) brownish yellow, with whitish hair ; fore wings wholly covered with white and black hair, giving in general a whitish appearance with a sprinkling of darker flecks ; there are two dark spots more pronounced than the others, one on the cross-vein r-m, and one in cell M a little before the level of the discal cell ; *hind wings* clear, whitish, with sparse short black hair ; *abdomen* lacking.

Length of the fore wing, 16 mm.

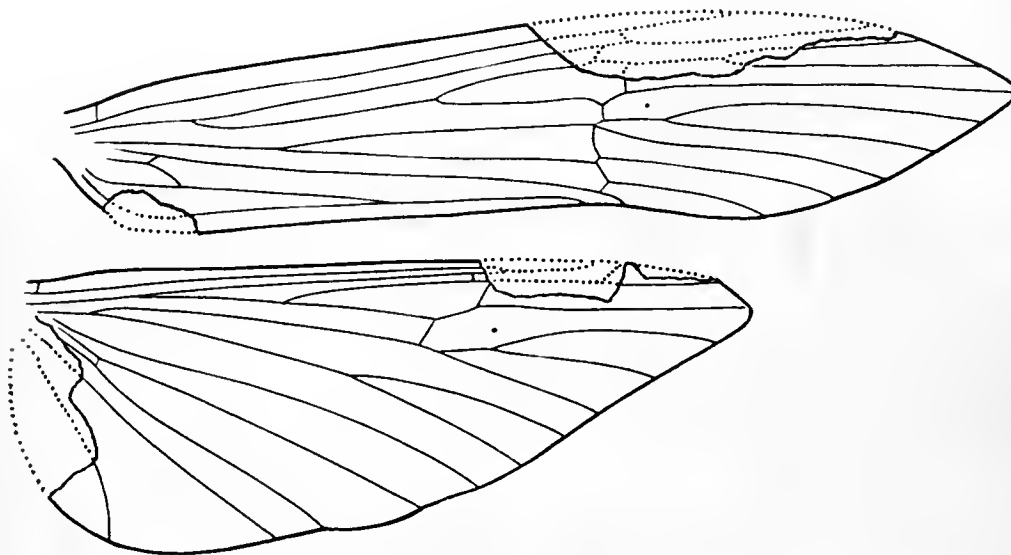


FIG. 118.—*Triplectides indica* Walk. ♀: wings.

The type is a female. In all probability this species is identical with *T. magna* Walker. Having regard to the impossibility of determining such a fragment, moreover a female, with absolute certainty, we consider it desirable to keep the species distinct, particularly as, should it actually prove to be *T. magna*, it would have priority, and considerable confusion in the literature would be caused by the lapsing of the latter name into synonymy.

***Loticana opposita* (Walker).**

(Fig. 119.)

- 1852. *Leptocerus oppositus* Walker, Cat. Neur. Brit. Mus. : 73.
- 1864. *Leptocerus oppositus* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 830.
- 1866. *Notanatolica opposita* McLachlan, Trans. Ent. Soc. London, (3) 5 : 257.
- 1906. *Notanatolica opposita* Ulmer, Notes Leyden Mus., 28 : 31-35.
- 1907. *Notanatolica opposita* Ulmer, Genera Insect., fasc. 60a : 131.

1913. *Notanatolica opposita* Banks, Proc. Ent. Soc. Washington, 15 : 176.
 1915. *Notanatolica opposita* Döhler, Deutsch. Ent. Zeitschr., 1915 : 406.
 1916. *Notanatolica opposita* Banks, Philipp. Journ. Sci., 11 (D) : 213.
 1916. *Notanatolica opposita* Ulmer, Ark. Zool. (13), 10 : 17-18, fig. 22.
 1930. *Notanatolica opposita* Ulmer, Treubia, 11 : 404, 462.
 1931. *Notanatolica opposita* Martynov, Mem. Mus. Hist. Nat. Belg., (2) 4 (hors série) : 15.
 1936. *Loticana opposita* Mosely, Trans. R. Ent. Soc. London, 85 : 121, figs. 91-94.

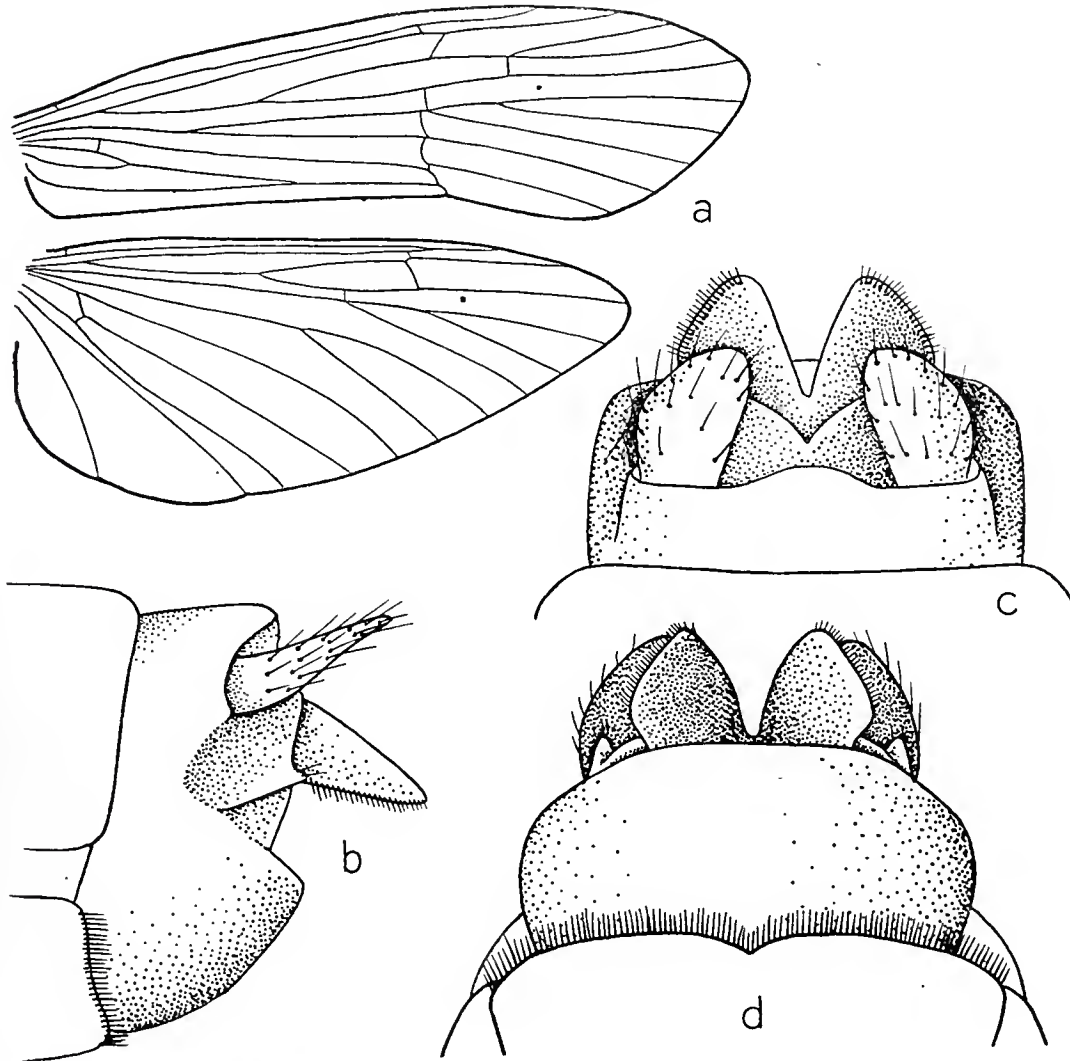


FIG. 119.—*Loticana opposita* Walk. ♀: *a*, wings; *b*, apex of the abdomen, lateral, *c*, dorsal, *d*, ventral.

Walker describes the species as follows :

"*Ferrugineus, subtus nigricans; antennis pedibusque testaceis; alae cinerae, fusco-pubescentes.*

"Ferruginous, blackish beneath, clothed with pale hairs: antennae pale testaceous, almost whitish, full thrice the length of the body: legs testaceous: wings gray, slightly clothed with pale brown down; veins pale. Length of the body $2\frac{1}{2}$ -3 lines; of the wings 10-11 lines.

"*a.* Van Dieman's Land. From Dr. Hooker's sale."

To this we add :

The discoidal cell of the fore wing is normal in shape, forks nos. 1, 3 and 5 present, fork no. 1 sessile ; hind wing, forks nos. 3 and 5 present, a cross-vein uniting R_1 with the sector ; cell M_2 reaching the cross-vein r-m ; spurs 2-2-2.

Genitalia, female.—Centre of the margin of the terminal dorsal segment produced ; there are two, rather broad superior appendages and beneath them, from above, are two triangular, membranous processes, rather closely fringed ; between the superior appendages and these processes are plates, slightly produced from below, at the outer, and from the side, the lower angles ; the 8th sternite is strongly chitinized and closely fringed, with a slight excision at the centre of its apical margin.

The type is now mounted in balsam with one pair of wings mounted dry.

In his Catalogue, Walker records only one example from Van Dieman's Land from Dr. Hooker's sale. In the British Museum collection there are two examples from the Hooker collection, and Ulmer records a third presented to him by Mr. Kirby, a former curator of the Neuroptera collection at the British Museum, and mentioned as a co-type. It would appear that the second example in the British Museum and the third in the Ulmer collection are merely additional examples.

We have been unable to obtain a male of the species, so that this sex continues to be unknown.

LIMNOPHILIDAE.

Glyphotaelius punctato-lineatus (Retzius).

(Fig. 120.)

- 1783. *Phryganea punctato-lineata* Retzius, De Geer Gen. et Sp. Insect. : 56 (referring to De Geer's description—Mem. 2 : 544-49, pl. 14, figs. 1-5).
- 1789. *Phryganea binervosa* Velliers, Linn. Ent., 3 : 44.
- 1791. *Phryganea punctata* Olivier, Encycl. Méth. : 538.
- 1848. *Glyphidotaulius umbraculum* Kolenati, Gen. et Sp. Trich., 1 : 37, pl. 1, fig. 1.
- 1852. *Limnephilus laevis* Walker, Cat. Neur. Brit. Mus. : 18.
- 1864. *Glyphotaelius punctato-lineatus* Hagen, Verh. Zool. Bot. Ges. Wien, 14 : 814.
- 1873. *Glyphotaelius punctato-lineatus* Hagen, Verh. Zool. Bot. Ges. Wien, 23 : 442.
- 1873. *Glyphotaelius punctato-lineatus* var. *frigidus* Hagen, Verh. Zool. Bot. Ges. Wien, 23 : 443.
- 1874. *Glyphotaelius punctato-lineatus* McLachlan, Rev. and Syn. Trich. : 41-43, pl. 5, fig. 1.
- 1874. *Glyphotaelius punctato-lineatus* var. *frigidus* McLachlan, Rev. and Syn. Trich. : 43.
- 1880. *Glyphotaelius punctato-lineatus* var. *frigidus* McLachlan, Rev. and Syn., Suppl. : 4, pl. 31, fig. 1.
- 1907. *Glyphotaelius punctatolineatus* Ulmer, Genera Insect., fasc. 60a : 39.

Walker describes *Limnephilus laevis* as follows :

“*Ferrugineus ; antennis palpis pectorisque disco nigris ; abdomen nigro varium ; alae anticae luridae, areola interclavali nigro guttata.*”

“*Ferruginous, clothed with pale hairs ; antennae, palpi and disk of the breast black ; abdomen, coxae and thighs marked with black ; fore-wings lurid, minutely*

tuberculated, with a row of black dots along the interclaval areolet; veins testaceous: hind-wings slightly gray. Length of the body 9 lines; of the wings 26 lines.

"a. (?) From Mr. Children's collection."

We add:

Head dark brown above, black around the bases of the antennae; face dark brown to black, with black hair; *antennae* (but three joints of each remain) dark brown with scant dark pubescence, the basal joint as long as the head, the 2nd short, the 2nd and 3rd together as long as the 1st; palpi dark brown; pronotum black at the lateral margins; the middle of the segment has a brown area on either side of the median line, somewhat tuberculate and with some pale hairs remaining; mesothorax dark brown, a broad median

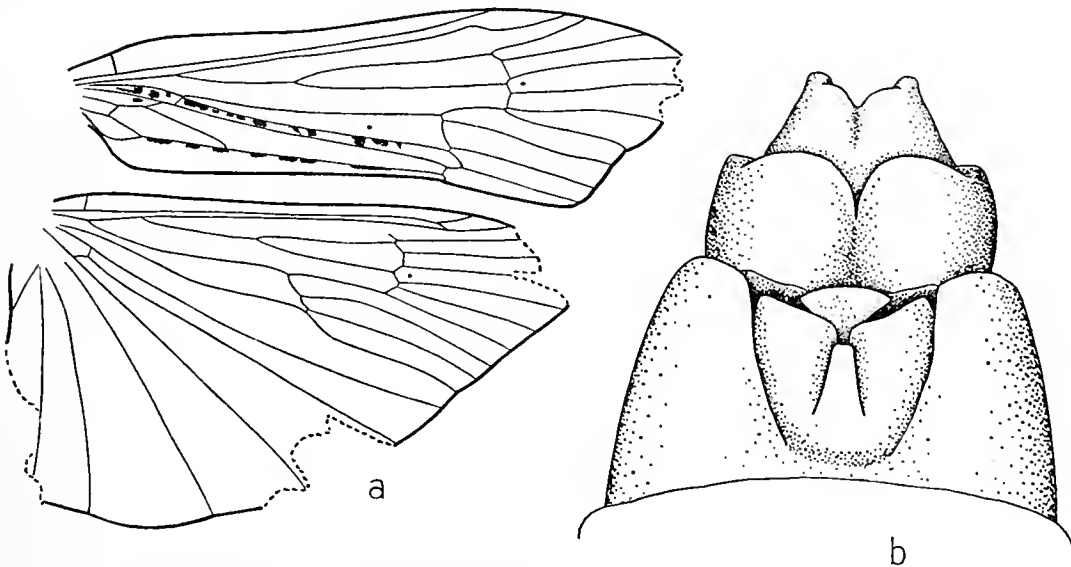


FIG. 120.—*Glyphotaelius punctato-lineatus* Retz. ♀: a, wings; b, apex of the abdomen, ventral.

band, tuberculate but nude; metathorax yellowish brown; *thorax* light brown beneath, the coxae with black markings; of the *legs*, only the first pair remain; these are blackish brown, with black spines and with yellowish pubescence; tegulae brown, the long hair of about the same colour; *fore wings* uniformly light brown, except that there is a line of very dark brown spots throughout cell Cu, and another line of such spots posterior to the 3rd anal vein; the costal margin is somewhat blackened from the stigma toward the apex; *abdomen* brown, with black markings, especially at the rear margins of the segments.

Length of the fore wing, 26 mm.

Genitalia, female.—Abdomen produced at its apex in a pair of small, blunt projections; below, ventrally, are two rounded plates or possibly the sternite of the penultimate segment; below these is the vulvar scale with a short median and a pair of very wide side-lobes, with a triangular plate set in the excision between them.

The single type of Walker's *Limnephilus laevis* is a female. While the exact locality of collection is unknown, the specimen is doubtless European.

In the McLachlan collection, recently acquired by the Trustees of the British Museum, there are good series of both *punctatolineatus* and the variety *frigidus*. In the latter, one of the characters on which the variety has been separated, namely the shape of the base of the 5th cellule in the anterior wing, is so variable as to discount its value. Walker's *laevis* actually conforms with the pattern of *frigidus* in this respect, and if, eventually, the variety should be considered as a distinct species, as hinted at by McLachlan, then Walker's name "*laevis*" would have priority.

SERICOSTOMATIDAE.

Philaniscus plebeius Walker.

(Figs. 121, 122.)

- 1852. *Philaniscus plebeius* Walker, Cat. Neur. Brit. Mus. : 116.
- 1864. *Philaniscus plebejus* Hagen, Verh. Zool. Bot. Ges. Wien, **14** : 854.
- 1865. *Anomalostoma alloneura* Brauer, Zweiter Bericht, Novara Neur. : 422.
- 1866. *Anomalostoma alloneura* Brauer, Novara-Exped.-Neur. : 16, pl. 1, fig. 6.
- 1868. *Philaniscus plebejus* McLachlan, Journ. Linn. Soc. Zool., **10** : 214 (*alloneura* Brauer listed as synonym).
- 1868. *Philaniscus plebejus* Brauer, Verh. Zool. Bot. Ges. Wien, **18** : 412.
- 1887. *Philaniscus plebejus* McLachlan, Ent. Mon. Mag., **24** : 154.
- 1904. *Philaniscus plebejus* Hudson, N.Z. Neuroptera : 79, 80, pl. 9, fig. 10.
- 1907. *Philaniscus plebejus* Ulmer, Genera Insect., fasc. **60a** : 99, pl. 12, figs. 106, 107.

Walker describes the species as follows :

"*Fulvus ; antennis pedibusque testaceis ; alae anticae subcinereae fusco maculatae, posticae subhyalinae.*

"*Male*.—Tawny, thinly clothed with tawny hairs : antennae testaceous, rather stout, slightly setaceous, much longer than the body : legs testaceous, long ; fore-tibiae without spurs ; hinder tibiae with two pairs of long spurs, one pair near the tips, the other at the tips : abdomen with two appendages at the tip : wings narrow ; fore-wings slightly gray, with pale brown marks or interrupted bands : hind-wings subhyaline. Length of the body $2\frac{1}{2}$ – $2\frac{3}{4}$ lines ; of the wings 7– $8\frac{1}{2}$ lines.

"*a, b.* New Zealand. Presented by Dr. Sinclair."

To this we add :

Head yellow above, with a series of brown warts ; anteriorly on the median line there is an oval (almost circular) area, the anterior half of which bears on either side an oblong darker spot on which there are some pale and a very few black hairs ; back of this median area and to the sides, at about the middle of the head are two almost round, brown warts, and near the hind margin still another pair, brown, oblique ; from the anterior median raised area there is a median brown stripe to the rear margin of the head, and near the anterior

end of this line another passes almost at right angles to it, toward the eyes and between the two rear pairs of warts; *antennae* (incomplete) stout, yellow, the segments broadly ringed brown; basal joints with some black hair; immediately before the antennae there is a broad, projecting process whose anterior margin is thickly studded with long, yellow scale-hairs; maxillary

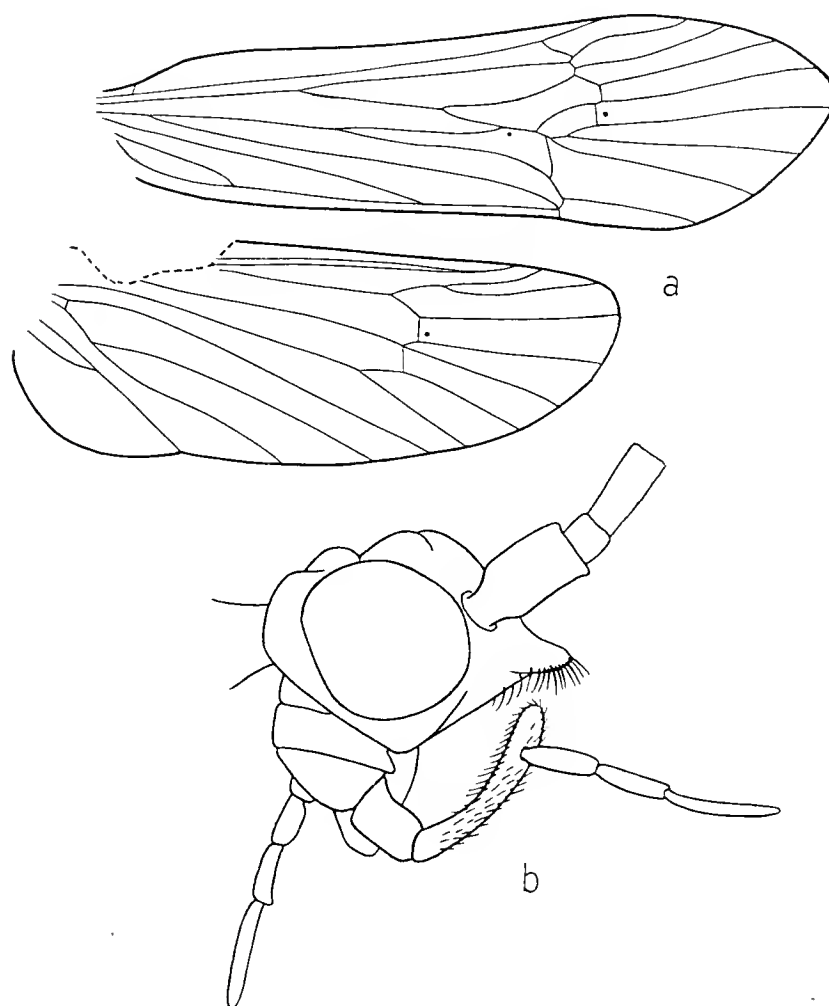


FIG. 121.—*Philanisus plebeius* Walk. ♂: *a*, wings; *b*, head and palpi, etc., lateral.

palpi yellow, beset with whitish and with some brown hair, the 1st joint short, the 2nd rather long, covered with short, yellow bristles, the 3rd inserted before the apex of the 2nd, the 3rd and 4th about equal in length, the 5th a little longer; labial palpi yellow; pronotum brown, with black and with pale hair, mesonotum brown, with some darker stripes, metanotum brown; *legs* yellow with brown spines on the tibiae and tarsi; *fore wings* pale yellowish, with irregular, indistinct transverse bands of brown; apical fringe short, with longer black hairs at the tips of the anal veins; *hind wings* pale, whitish, the

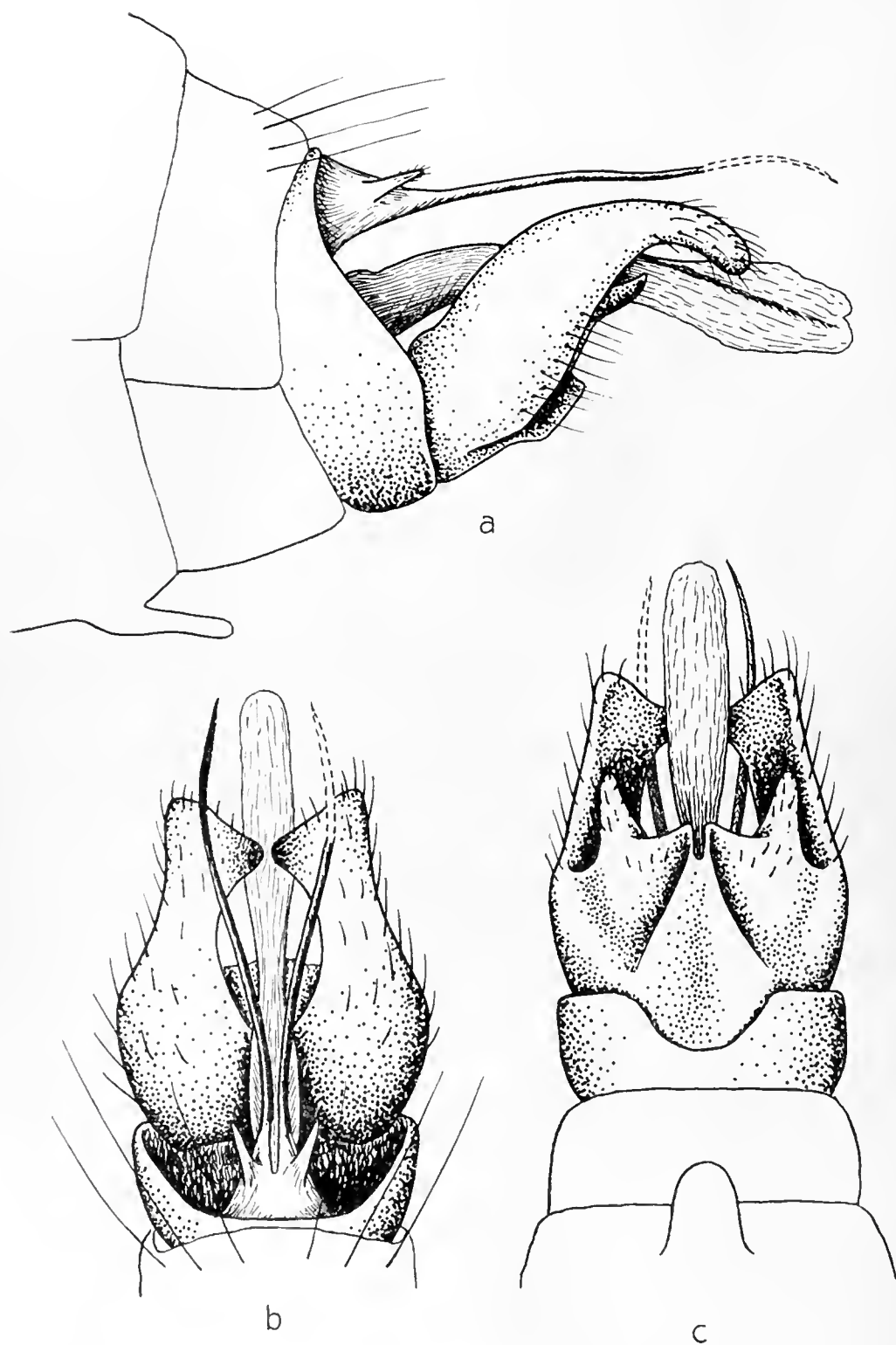


FIG. 122.—*Philanisus plebeius* Walk. ♂: *a*, genitalia, lateral, *b*, dorsal, *c*, ventral.

large anal lobe rather sharply set off ; *abdomen* yellowish brown, with darker markings.

Genitalia, male.—Apical margin of the 9th tergite widely excised ; two very long black spines in the cavity appear to represent an upper penis-cover, with two small processes on its upper surface at the base ; between the spines is a long penis with a slender stem and gradually dilated apex ; inferior appendages very large, furcate, directed upward and distally ; from above, the apices are obliquely truncate, inner angles forming blackened, rounded knobs ; from the side, the appendage curves distally with a claw-like branch arising on its lower margin, directed upward ; from beneath, the bases of the appendages are fused together with a short, narrow excision between ; apical margin of the 9th sternite deeply and roundly excised ; a spatulate process to the 7th sternite.

Neither of Walker's types, both males, is in good condition. We select as the type the specimen so labelled with the abdomen mounted in canada balsam. The figure of the venation is from another example

This is the only known Caddis fly which inhabits sea-water, the larvae being found in rock-pools near low-water mark, though Siltala records many species found in the brackish waters of the Baltic.

Specific names. (The leading names throughout are Walker's).	Walker's generic designation.	Present generic placement.	Habitats of specimens listed by Walker.													Number of Walker specimens now in the collection.			
			Venezuela.	Brazil.	Amazon Regn.	S. America.	Port Natal.	Sierra Leone.	China.	India.	Ceylon.	Australia.	New Zealand.	Tasmania.	Europe.	Unknown.	Total.	♂	♀
<i>diminuta</i>	<i>Hydropsyche</i>	<i>Cheumatopsyche</i>	3	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	1
<i>albovirens</i>	<i>Macronema</i>	<i>Leptonema</i>	1	..	..	..	..	..	..	..	..	..	..	..	..	1	4	2	1
<i>albovirens</i> = <i>ulmeri</i>	"	"	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1?
<i>inscriptus</i> = <i>australe</i>	<i>Monopseudopsis</i>	<i>Macronema</i>	..	..	..	..	..	..	1	..	..	..	..	..	..	1	1	1	..
<i>capensis</i>	<i>Macronema</i>	"	..	..	..	1	2	..	..	..	..	..	..	..	..	1	2	2	1
<i>signata</i> = <i>capense</i>	"	"	..	..	..	..	..	2	..	..	..	..	..	..	..	2	2	2	..
<i>inscripta</i> = <i>capense</i>	"	"	..	..	..	..	1	..	..	..	..	..	..	..	..	1	1	1	..
<i>pulcherrima</i> = <i>capense</i>	"	"	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1	..
<i>fastosa</i>	"	"	..	..	..	..	..	..	1	..	..	..	..	..	..	1	1	1	..
<i>multifaria</i>	<i>Hydropsyche</i>	"	..	..	..	..	..	..	..	1	..	..	..	..	..	1	1	1	..
<i>peruviana</i>	<i>Macronema</i>	"	..	..	1	..	..	..	..	..	..	..	..	..	..	1	1	1	..
<i>apicalis</i>	"	<i>Centromacronema</i>	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1	..
<i>oculata</i>	"	"	3	..	..	..	..	..	..	..	..	..	..	..	..	3	2	2	1*
<i>cuprea</i> = <i>auripenne</i>	"	"	..	1	..	..	..	..	..	..	..	..	..	..	..	1	1	1	..
<i>abjurans</i> = <i>auripenne</i>	<i>Leptocerus</i>	"	..	1	..	..	..	..	..	..	..	..	..	..	..	1	1	1	..

* This specimen is in Dr. Ulmer's collection.

Specific names. (The leading names throughout are Walker's).	Walker's generic designation.	Present generic placement.	Habitats of specimens listed by Walker.													Number of Walker specimens now in the collection.		
																♂	♀	
			Venezuela.	Brazil.	Amazon Regn.	S. America.	Port Natal.	Sierra Leone.	China.	India.	Ceylon.	Australia.	New Zealand.	Tasmania.	Europe.			Unknown.	Total.
<i>quadrifurca</i> = <i>auripenne</i>	<i>Leptocerus</i>	<i>Centromacronema</i>	..	1	..	..	..	..	..	..	..	..	..	..	..	1	1	..
<i>niveistigma</i> = <i>auripenne</i>	"	"	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	1
<i>nigricornis</i>	<i>Polymorphanisus</i>	<i>Polymorphanisus</i>	..	..	..	..	..	1	..	..	..	..	..	..	..	1	1	..
<i>robusta</i> = <i>bimaculata</i>	<i>Anticyra</i> ?	<i>Neureclipsis</i>	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1?
<i>capensis</i>	<i>Dipseudopsis</i>	<i>Dipseudopsis</i>	..	..	..	1	..	..	..	..	..	..	..	..	..	1	1	..
<i>vicaria</i>	<i>Hydropsyche</i>	<i>Ganonema</i>	1	..	..	..	..	..	..	..	..	1	..	..	..	1	..	1
<i>humeralis</i>	<i>Ascalaphomerus</i>	<i>Ascalaphomerus</i>	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
<i>claudens</i>	<i>Musarna</i>	<i>Barypenthus</i>	..	1	..	..	..	..	..	..	..	..	..	..	..	1	1	..
<i>aperiens</i> = <i>concolor</i>	"	"	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	1
<i>interclusa</i>	"	"	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	1
<i>cephalotes</i>	<i>Leptocerus</i>	<i>Tripletides</i>	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1	..
<i>magnus</i>	"	"	..	..	..	..	..	..	..	..	..	..	..	..	5	5	5	..
<i>indicus</i>	"	"	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	1
<i>oppositus</i>	"	<i>Loticana</i>	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	1
<i>laevis</i> = <i>punctatolineatus</i>	<i>Linnephilus</i>	<i>Glyphotaelius</i>	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
<i>plebeius</i>	<i>Philanisus</i>	<i>Philanisus</i>	..	..	..	..	..	..	..	..	2	..	..	..	..	2	2	..

INDEX

- aba, *Triænodes*, 79
 abjurans, *Centromacronema*, 209
 abjurans, *Leptocerus*, 209, 210, 212
 adironica, *Plectrocnemia*, 36
 albida, *Leptocella*, 61, 63
 albida, *Setodes*, 61
 albidus, *Leptocerus*, 61
 albstictus, *Leptocerus*, 56
 albovirens, *Leptonema*, 188, 190
 albovirens, *Macronema*, x, 188, 191
 Allegophylax, 153, 156
 alloncura, *Anomalostoma*, 238
 alternans, *Hydropsyche*, 19, 20, 21, 23
 alternans, *Philopotamus*, 19
 americanum, *Ganonema*, 45
 americanum, *Sericostoma*, 45
 americanus, *Philopotamus*, 14
 amicus, *Hallesus*, 159
 amicus, *Platycentropus*, 159, 161
 Anabolia, 142
 Anabolina, 140
 Anisocentropus, 39
 antica, *Neuronia*, 145
 antica, *Pycnopsyche*, 144, 145
 Apatania, 174
 aperiens, *Musarna*, 225
 apicale, *Centromacronema*, 205
 apicale, *Macronema*, 205
 apicalis, *Macronema*, 205
 apicalis, *Oecetina*, 67
 Arctoccia, 111
 areolata, *Enoieyla*, 164
 areolata, *Platyphylax*, 164
 areolatum, *Chilostigma*, 164
 areolatus, *Glyphopsyche*, 164
 areolatus, *Limnephilus*, 164
 Ascalaphomerus, 220
 aspinosus, *Leptocerus*, 53, 56
 atra, *Mystacides*, 72
 auripenne, *Centromacronema*, 209
 auripenne, *Macronema*, 209
 auripenne, *Macrostemum*, 209
 australe, *Macronema*, xi, 193
 australis, *Macronema*, 193
 azurea, *Mystacides*, 74

 Banks, Nathan, x
 Barypenthus, 222
 betteni, *Hydropsyche*, 21
 bicolor, *Polycentropus*, 214
 bifasciatum, *Macronema*, 200
 bifida, *Mystacides*, 75
 bimaculata, *Anabolia*, 142
 bimaculata, *Neureclipsis*, 214
 binaculata, *Phryganea*, 214
 bimaculatus, *Limnephilus*, 142
 bimaculatus, *Polycentropus*, 214
 binervosa, *Phryganea*, 236
 bipunctatus, *Oestropsis*, 214
 blenda, *Molanna*, 51
 boreale, *Heteroplectron*, 47
 borealis, *Astoplectron*, 47
 borealis, *Heteroplectron*, 47, 49
 Brachycentrus, 177
 braconoides, *Chimarra*, 15
 braconoides, *Curgia*, 15
 brevipennis, *Phacopteryx*, 112
 bryanti, *Glyphopsyche*, 172

 Caborius, 114
 CALAMOCERATIDAE, 39, 218
 canescens, *Leptocerus*, 229
 capense, *Macronema*, 194, 196, 199
 capensis, *Dipseudopsis*, 216
 capensis, *Macronema*, 194, 195
 centralis, *Dipseudopsis*, 216
 Centromacronema, 205
 cephalotes, *Leptocerus*, 223
 cephalotes, *Notanatolia*, 228
 cephalotes, *Triplectides*, 228
 Cheumatopsyche, 25, 187
 childreni, *Neuronia*, xi, 90
 Chilostigma, 164
 Chimarra, 15
 cinerascens, *Leptocerus*, 55
 cinerea, *Molanna*, 51
 cinerea, *Neophryganea*, 80
 cinerea, *Phryganea*, ix, 79, 85
 claudens, *Barypenthus*, 222, 224
 claudens, *Musarna*, 222
 coagulatum, *Platyphylax*, 166
 eognata, *Notanatolia*, 229
 eognatus, *Leptocerus*, 229
 Colpotaulius, 137
 combinatus, *Goniotaulius*, 132, 134
 combinatus, *Limnephilus*, 132, 134
 commixta, *Neuronia*, 85, 87
 concatenata, *Banksiola*, 88, 90, 91
 concatenata, *Neuronia*, x, 88
 concentrica, *Arctoccia*, 112
 concolor, *Barypenthus*, 224, 225
 concolor, *Musarna*, 225
 confusa, *Hydropsyche*, 21
 confusa, *Plectrocnemia*, 36
 confusus, *Philopotamus*, 21
 confusus, *Polycentropus*, 36, 38

- connexa, Astoplectron, 47
 connexa, Psilotreta, 47
 consocia, Anabolia, 111
 consocia, Aretoecia, 111
 consocia, Colpotaulius, 111
 consocius, Goniotauius, 111
 consocius, Limnephilus, 111
 consocius, Stenophylax, 111
 crassicornis, Sericostoma, 178
 crassicornis, Agarodes, 179
 crassicornis, Hydropsyche, 178
 crassicornis, Neureclipsis, 36, 38
 crassicornis, Notidobia, 178,
 crassicornis, Plectrocnemia, 36
 crassicornis, Polycentropus, 29, 30, 34, 36
 crepuscularis, Brachycentrus, 27
 crepuscularis, Neureclipsis, 27, 29, 30, 31, 36
 crepuscularis, Phryganea, 27
 crepuscularis, Polycentropus, 27
 cuprea, Macronema, 209, 212
 cupreum, Macronema, 209

 dan, Halesus, 147
 dan, Stenophylax, 147
 Denning, D. G., x
 depravata, Hydropsyche, 21
 designata, Enoicyla, 161
 designata, Platyphylax, 161
 designatus, Hesperophylax, 16
 designatus, Limnephilus, x, 161
 designatus, Platyphylax, 161
 despectus, Goniotauius, 116
 despectus, Limnophilus, 116, 121, 126
 difficile, Chilostigma, 166
 difficile, Frenesia, 166
 difficilis, Cryptothrix, 166
 difficilis, Enoicyla, 166
 difficilis, Limnephilus, 165, 166
 dilutus, Leptocerus, 53
 diminuta, Cheumatopsyche, 187
 diminuta, Hydropsyche, 187
 diminuta, Hydropsychodes, 187
 Dipseudopsis, 216
 dispectus, Goniotauius, 116
 dissimile, Heteroplectron, 47
 dissimilis, Heteroplectron?, 47, 49
 dissimilis, Psilotreta, 47
 distincta, Notidobia, 181
 distinctus, Dolophilodes, 11
 distinctus, Philopotamus, x, 11, 14
 distinctus, Trentonius, 11
 divergens, Anabolia, 146, 149
 divergens, Limnephilus, 144, 146, 149, 150
 divergens, Pycnopsyche, 146
 divergens, Stenophylax, 147, 149
 divulsa, Phryganea, ix, 83

 Dolophilodes, 11
 dubia, Hydropsyche, 21
 dubitans, Hydropsyche, 27, 29, 31
 dubitans, Neureclipsis, 31
 dubitans, Neuronina, 105, 106

 elegans, Goera, 39
 elegans, Leptocerus, 39
 eminens, Limnephilus, 116, 120
 erraticus, Athripsodes, 58, 59
 erraticus, Leptocerus, 59
 exquisita, Leptocella, 63
 exquisita, Setodes, 63
 exquisitus, Leptocerus, 63
 extractus, Limnophilus, 135

 fasciata, Dipseudopsis, 216
 fasciatum, Macronema, 199
 fastosa, Macronema, 199
 fastosa, Mystacida, 199
 fastosum, Macronema, 199
 femoralis, Goniotauius, 122
 femoralis, Limnephilus, 121, 122, 124, 126
 flaveolata, Setodes, 67
 flaveolatus, Leptocerus, 67
 flavicornis, Molanna, 51
 flavida, Oecetina, 67
 floridana, Oecetina, 67
 Frenesia, 140, 165
 frigidus, Glyphotaelius, 238
 frontalis, Psilotreta, 47, 49
 fuliginosa, Phryganea, 177
 fuliginosus, Brachycentrus, 177
 fumosa, Oecetis, 56
 fusca, Neuronina, x, 97, 100, 102, 103, 104,
 105, 106, 107, 111
 fusca, Phryganea, 102, 105, 107
 fuscula, Neuronina, 3
 fuscula, Rhyacophila, 3
 fuscum, Macronema, 200

 Ganonema, 45, 218
 Glyphopsyche, 171
 Glyphotaelius, 236
 grisea, Notidobia, 181
 guttata, Phryganea, 129
 guttifer, Halesus, 150, 154, 156
 guttifer, Pycnopsyche, 147, 150
 guttifer, Stenophylax, 150

 Halesus, 144
 helo, Triaenodes, 79
 Hesperophylax, 161
 Heteroplectron, 49
 hospitum, Macronema, 194

- hostis*, *Hallesus*, 157
hostis, *Platycentropus*, 157
humeralis, *Asealaphomerus*, 220
hyalinus, *Limnophilus*, 135
Hydropsyche, 19
HYDROPSYCHIDAE, 19, 187
HYDROPTILIDAE, 8
- ignita*, *Setodes*, 75
ignita, *Triaenodella*, 75
ignita, *Triaenodes*, 75
ignitus, *Leptocerus*, 69, 75, 79
ineanus, *Brachycentrus*, 177
ineerta, *Oceetina*, 67
ineerta, *Oceetis*, 67
ineerta, *Setodes*, 67, 69
incertus, *Leptocerus*, 67, 69
ineonspicua, *Leptocerus*, x
inconspicua, *Molanna*, 49, 69
ineonspicua, *Oceetis*, 50, 67, 71
ineonspicua, *Leptocerus*, 49, 50, 67
indeeisa, *Coera*, 46
indeeisa, *Hydropsyche*, 19, 20
indeeisa, *Psilotreta*, 46
indecisum, *Heteroplectron*, 47
indecisus, *Leptocerus*, 46
indecisus, *Philopotamus*, 19, 20
indica, *Tripleetides*, 233
indicans, *Hallesus*, 157
indicans, *Limnophilus*, 157
indicans, *Platycentropus*, 157, 161
indicus, *Leptocerus*, 233
indistinctus, *Hallesus*, 159
indistinctus, *Halleysus*, 159
indistinctus, *Hylepsyche*, 159
indistinctus, *Limnophilus*, 159, 161
indistinctus, *Platycentropus*, 159
indivisus, *Limnophilus*, 129
inornata, *Oceetina*, 67
inscripta, *Maeronema*, 194, 195
inscriptum, *Maeronema*, 194, 195, 196
inscriptus, *Monopseudopsis*, 193
intercisa, *Chilostigma*, 172
intercisa, *Eelisoptyryx*, 172
intercisa, *Enoicyla*, 171
intercisa, *Limnophilus*, 171, 172, 174
interclusa, *Musarna*, 226
interclusus, *Barypenthus*, 224, 226
invaria, *Rhyacophila*, 5
invarius, *Polycentropus*, 5
irrorata, *Eelisoptyryx*, 172
irrorata, *Glyphopsyche*, 171, 172, 174
irrorata, *Neuronia*, 88
irrorata, *Phryganea*, 171
irroratus, *Glyphopsyche*, 172
- Kimmins*, D. E., x
kovalevskii, *Phryganea*, 102
- laevis*, *Limnophilus*, 236, 238
lateralis, *Brachycentrus*, 178
latifascia, *Anisocentropus*, 39
latifascia, *Leptocerus*, 39
latifascia, *Notidobia*, 39
legendrina, *Notanatolia*, 230
lepida, *Enoicyla*, 153
lepida, *Platyphylax*, 153
lepidus, *Allegophylax*, 153
lepidus, *Platyphylax*, 153
lepidus, *Stenophylax*, 153
Leptocella, 61
LEPTOCERIDAE, 51, 228
Leptocerus, 51
Leptonema, 188
LIMNOPHILIDAE, 111, 236
Limnophilus, 116
Loticiana, 234
lucia, *Chimarrha*, 17, 19
luctuosa, *Rhyacophila*, 5
lugens, *Leptocerus*, 53
- maegillivrayi*, *Limnophilus*, 129
Macronema, 26, 193
maelicornis, *Hydropsyche*, 21, 23, 24
maelicornis, *Tinodes*, 24
maculipennis, *Hallesus*, 157
maculipennis, *Platycentropus*, 157
magna, *Notanatolia*, 229
magna, *Tripleetides*, 229, 234
magnus, *Leptocerus*, 229
medialis, *Aretoccia*, 111
medialis, *Colpotaulius*, 111
medialis, *Limnophilus*, 111
mentiens, *Athripsodes*, 51
mentiens, *Leptocerus*, 51
menticus, *Leptocerus*, 51
mephita, *Triaenodes*, 77
micans, *Setodes*, 67, 69
missum, *Chilostigma*, 165
Molanna, 49
MOLANNIDAE, 49
morosa, *Hydropsyche*, 20, 21
multifaria, *Hydropsyche*, 202
multifarium, *Maeronema*, 202
multifarius, *Limnophilus*, 110, 117, 120
musetta, *Molanna*, 51
Mystacides, 71
- nebulosus*, *Goniotautilus*, 122
nebulosus, *Limnophilus*, 117, 121, 125, 126
Neureclipsis, 27, 214
Neuronia, 88

- nigra, Apatania, 174
 nigra, Apatelia, 174
 nigra, Leptocerus, 72
 nigra, Mystacides, 72
 nigra, Phryganea, 174, 176
 nigra, Potamaria, 174
 nigricornis, Oestropsis, 212
 nigricornis, Polymorphanisus, 212, 214
 nigritta, Beraea, 19
 nigrum, Ganonema, 46
 nivea, Setodes, 61, 63
 niveistigma, Centromacronema, 209
 niveistigma, Leptocerus, 209, 212
 Notidobia, 178
 numerosus, Brachycentrus, 178

 obscura, Beraea ?, 7, 17
 obscura, Chimarra, 7, 17
 obscurum, Centromacronema, 209
 obscurum, Macronema, 209
 obscurus, Agapetus, 7
 ocellifera, Neuronina, 97, 105, 107, 111
 ocellifera, Ptilostomis, 98, 100
 ocelligera, Neuronina, 91
 ocelligera, Oligostomis, 92
 ochracea, Triaenodella, 77
 oculata, Macronema, 207
 oculatum, Centromacronema, 207
 oculatum, Macronema, 207
 ODONTOCERIDAE, 46, 222
 Oecetis, 56, 67
 opposita, Loticana, 234
 opposita, Notanatolica, 234
 oppositus, Leptocerus, 234

 pallidum, Chilostigma, 166
 pallidum, Leptonema, 190
 pardalis, Eubasilissa, 94
 pardalis, Neuronina, 94
 pardalis, Regina, 94
 partitus, Goniotauius, 127
 partitus, Limnophilus, 127
 parva, Hydroptila, x, 39
 parva, Psychomyia, 39
 parva, Tinodes ?, 39
 parvula, Neureclipsis, 29, 31, 38
 parvula, Oecetina, 67
 parvulus, Neureclipsis, 29
 percitans, Macronema, 203
 perforatus, Limnophilus, 116, 118, 120, 121, 123, 125, 126
 perplexa, Pycnopsyche, 144, 149
 perpusilla, Anabolina, 140
 perpusillus, Colpotaulius, 140
 perpusillus, Limnophilus, 140
 Phacopteryx, 112
 Philanisus, 238
 PHILOPOTAMIDAE, 11
 Phryganea, 79
 PHRYGANEIDAE, 79
 Phylocentropus, 34
 placidus, Holocentropus, 34
 placidus, Phylocentropus, 34, 38
 plaga, Goniotauius, 120
 plaga, Limnophilus, 120
 Platycentropus, 157
 Platyphylax, 144
 plebeius, Philanisus, 238
 plebejus, Philanisus, 238
 plebejus, Philanisus, 238
 Plectrocnemia, 36
 plutonis, Wormaldia, 17, 19
 POLYCENTROPIDAE, 27, 214
 polygrammatum, Macronema, 26
 Polymorphanisus, 212
 postica, Neuronina, 98, 100, 105, 107, 111
 postica, Ptilostomis, 98, 100
 praeterita, Ecclisopteryx, 168
 praeterita, Enoicyla, 168
 praeteritum, Chilostigma, 168
 praeteritum, Frenesia, 168
 praeteritus, Limnophilus, 165, 168
 Protoptila, 8
 Psilotreta, 46
 PSYCHOMYIDAE, 39
 pudicus, Goniotauius, 137
 pudicus, Limnophilus, 137
 pulcherrima, Macronema, 194, 195
 pulcherrimum, Macronema, 194, 198
 punctata, Phryganea, 236
 punctatissima, Anabolina, 114
 punctatissimus, Allophylax, 114
 punctatissimus, Asynarchus, 114
 punctatissimus, Caborius, 114
 punctatissimus, Halesus, 114
 punctatissimus, Stenophylax, 114
 punctato-lineata, Phryganea, 236
 punctato-lineatus, Glyphotaelius, 236
 Pycnopsyche, 144, 156
 pyraloides, Anisocentropus, 42
 pyraloides, Ganonema, 42
 pyraloides, Notidobia, 42

 quadrifurca, Centromacronema, 209
 quadrifurca, Leptocerus, 209, 210, 212
 quadrifurca, Macronema, 209
 quinquepunctatum, Macronema, 200

 reciproca, Hydropsycha, 22
 reciprocus, Philopotamus, 22
 recurvatus, Leptocerus, 53
 redmani, Neuronina, 96

- resurgens, *Athripsodes*, 53.
 resurgens, *Leptocerus*, 53
 resurgens, *Setodes*, 53
 retactus, *Leptocerus*, 53
 rhodesianum, *Macronema*, 195
 rhombica, *Phryganea*, 132
 rhombicus, *Chaetotaulius*, 132
 rhombicus, *Limnophilus*, 132
 Rhyacophila, 3
 RHYACOPHILIDAE, 3
 robusta, *Antieyra*?, 214, 215
 robusta, *Chcumatopsyche*, 25
 robusta, *Hydropsyche*, x, 25
 robusta, *Holocentropus*, 25
 robusta, *Polycentropus*, 25
 robustus, *Holocentropus*, 25
 Ross, H. H., x
 rufa, *Heteroplectron*, 47
 rufa, *Molanna*, 46
 rufipes, *Barypenthus*, 222, 224

 saecus, *Athripsodes*, 58, 60
 sagitta, *Setodes*, 67
 sansibarica, *Macronema*, 194
 sansibaricum, *Macronema*, 195
 sansoni, *Limnophilus*, 129
 sayi, *Phryganea*, 83
 scabripennis, *Hallesus*, 145
 scabripennis, *Limnephila*, 144
 scabripennis, *Pycnopsyche*, 144
 scabripennis, *Stenophylax*, 144, 146
 secludens, *Limnophilus*, 140
 semifasciata, *Neuronia*, 102, 106
 semifasciata, *Phryganea*, 102
 semifasciata, *Ptilostomis*, 103
 separata, *Hydropsyche*, 21
 sepulchralis, *Leptocerus*, 71
 sepulchralis, *Mystacides*, x, 71, 75
 sepulchralis, *Psychomyia*, 71, 72
 sepultum, *Macronema*, 194
 SERICOSTOMATIDAE, 177, 238
 Setodes, 69
 signata, *Macronema*, 194, 195
 signatum, *Macronema*, 194, 195, 198, 199
 signatus, *Polycentropus*, 31
 similis, *Hallesus*, 150
 similis, *Pycnopsyche*, 150
 simulans, *Neuronia*, 102, 105, 106, 107
 sjostedti, *Macronema*, 194, 199
 sordida, *Anabolia*, 142
 sordidus, *Limnophilus*, 142
 Stenophylax, 144
 stigma, *Limnophilus*, 130
 stipatus, *Limnophilus*, 121, 123, 125, 126
 striata, *Phryganea*, 80
 stygipes, *Neuronia*, 91, 94
 stygipes, *Oligostomis*, 92
 subfasciatus, *Allegophylax*, xi, 157
 subfasciatus, *Platyphylax*, 156
 subfasciatus, *Stenophylax*, 153
 subguttatus, *Limnophilus*, 129, 132
 sublunatus, *Limnophilus*, 127, 129
 submacula, *Athripsodes*, 56, 59
 submacula, *Leptocerus*, x, 56, 59
 submaeulus, *Leptocerus*, 56
 submonilifer, *Anabolia*, 137
 submonilifer, *Colpotaulius*, 137
 submonilifer, *Goniotauius*, 137
 submonilifer, *Limnophilus*, 137
 submonilifer, *Rheophylax*, 137
 subpunctulatus, *Limnophilus*, 122
 Synagapetus, 7

 tarsalis, *Colpotaulius*, 140
 tenebrosa, *Agapetus*, 8
 tenebrosa, *Hydroptila*, 8
 tenebrosa, *Protophila*, 8
 tigurinensis, *Phryganea*, 214
 Tinodes, 39
 transversa, *Hydropsyche*, 26
 transversa, *Macronema*, 26
 transversum, *Macronema*, 26
 Trentonius, 11
 Trienodella, 75
 trimaculatus, *Limnophilus*, 127
 Triplectides, 228
 tryphena, *Molanna*, 49, 69

 Ulmer, G., x
 ulmeri, *Leptonema*, 190, 191
 umbraculum, *Glyphidotauius*, 236

 valida, *Neureclipsis*, 29, 31
 validus, *Neureclipsis*, 31
 validus, *Polycentropus*, 31
 vanus, *Leptocerus*, 51, 53
 variegata, *Phryganea*, 116
 variegatus, *Leptocerus*, 53, 56
 vernalis, *Setodes*, 69
 vestita, *Dasystegia*, 85
 vestita, *Neuronia*, 85
 vestita, *Phryganea*, 85
 vestita, *Prophryganea*, 85
 vicaria, *Hydropsyche*, 218
 vicarium, *Ganonema*, 218
 vicarium, *Macronema*, 218

 walkeri, *Hydropsyche*, xi, 21, 23
 walkeri, *Synagapetus*, 7, 19

 zebratum, *Macronema*, 194

PRESENTED

JUN 1940



